Catch up on all the latest from CPC land PLUS your chance to win some fabulous Baseball gear inside this issue

AMSTRAD COMPUTER USER

ACU

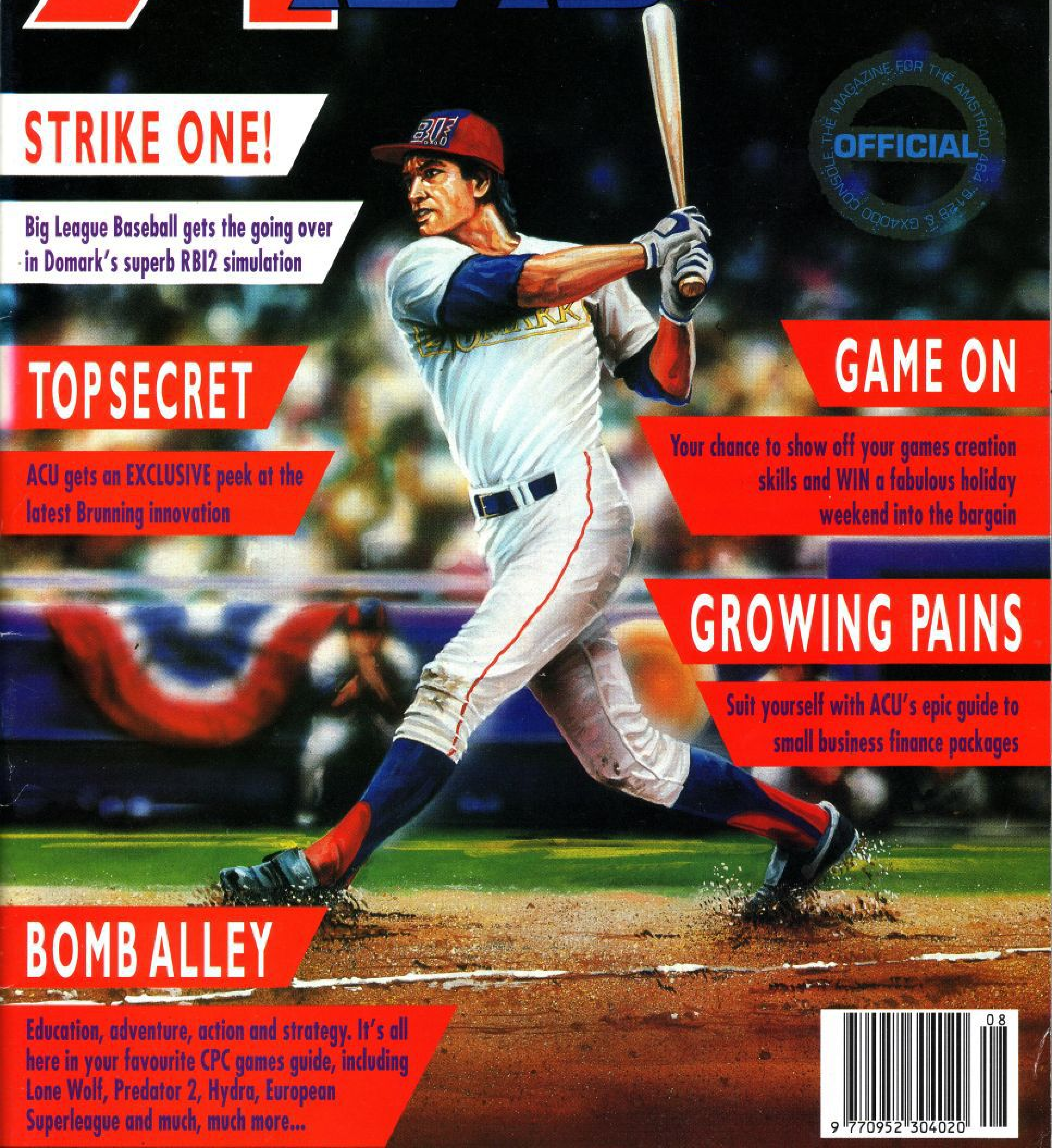
AUGUST 1991

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THE MAGAZINE FOR THE AMSTRAD 464 6128 & GX4000 CONSOLE

OFFICIAL



STRIKE ONE!

Big League Baseball gets the going over in Domark's superb RBI2 simulation

TOPSECRET

ACU gets an EXCLUSIVE peek at the latest Brunning innovation

GAME ON

Your chance to show off your games creation skills and WIN a fabulous holiday weekend into the bargain

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Suit yourself with ACU's epic guide to small business finance packages

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Education, adventure, action and strategy. It's all here in your favourite CPC games guide, including Lone Wolf, Predator 2, Hydra, European Superleague and much, much more...

08

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Disney's
DuckTales
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BIG BUCKS!
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The ultimate challenge has been issued... now, you must race across the globe in search of fortune and glory to become the richest duck in the world!! The adventure will require all your skills and courage
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BrunWord

Complete Word Processing Package £30

BrunWord 6128 is a complete word processing Package consisting of a word processor, spelling checker and card filing programme. It out performs all other word processors for the CPC6128.

BrunWord uses its own high speed screen routine, giving it a very fast response. The editor features are logically arranged, to be easy to learn and the spelling checker with its dictionary load into memory at the same time as the word processor. The whole system is very convenient and exceptionally fast. It is supplied with an introductory tutor file.

BrunWord Features

*40, 80 or 128 columns. *Typing speed 200 words/min. *True insert or overwrite. *Justify or unjustify paragraph or whole text. *Balanced justification. *Instant word wrap. *Block save, move, copy, insert and delete. *Local editing with word delete/undelete. *Adjustable margins and TABs. *Word count. *Column/Line/Page display with file name. *Find and replace. *Help menus. *Memory files. *Single character embedded printer commands (18 with 3 codes and 21 with 10 codes). *Page throw markers. *Multiple copies. *Odd/even page headers/footers with page numbers. *Multi file printing. *Print specified pages. *Use any printer. *True display super/subscript numbers. *User defined characters. *Load/Save ASCII files from/to other word processors. *Files can be encrypted. *Maximum file size about 9 pages.

BrunSpell Features

*Memory resident programme and dictionary. *Checks 4,000 words/min. *30,000 word dictionary. *No American spellings. *Add up to 5,000 of your own words. *Instant lookup. *Helps to find correct spelling. *Automatic correction.

DataFile Features

*Alphabetical, numerical, date sorting. *User defined headings. *Search routine. *Data merging. *Label printing.

Quotes

"It may seem that I have just written a very long advert for BrunWord 6128 but I haven't, I'm just so impressed."
(Phil Craven, ACU Feb 90, page 25).

"One such is Peter Brunning's BrunWord 6128 which is without doubt in my mind, the most powerful and friendly word processor available for the 6128 today, with the possible exception of.... BrunWord Elite!"
(David Dorn, ACU July 90, page 43).

How They Compare

	BrunWord 6128 & BrunSpell	Protext Disc & Prospell	Tasword 6128 & Taspell
Typing into 241 word paragraph	218 w/m	218 w/m	16 w/m
Typing into start of text	218 w/m	218 w/m	150 w/m
Scroll to end, line by line	1 min 27 sec	2 min 2 sec	2 min 25 sec
Justify paragraph of 241 words	1 sec	0·2 sec	34 sec
Change appearance to format and Appearance to Format	17 sec	17 sec	53 sec
Spelling check 3366 words	52 sec	6 min 24 sec	18 min 46 sec
Average speed	3883 w/m	526 w/m	179 w/m
Disc changes	None	8	3
Spelling help 'NECESERY'	1 sec	12 sec	Not possible
Spelling check word at cursor	0·5 sec	Not possible	Not possible
Screen format - columns	40, 80, 128	40 or 80	80 only
Page boundaries	Shown	Not shown	Shown

BrunWord Elite

Elite Word Processor For CPC6128 £55

BrunWord Elite has a unique advantage over its rivals, it can only be used with dot matrix printers. All other word processors are compromised to drive daisy wheel and dot matrix printers.

In the early days of computing a printer was simply a form of electric typewriter. (High quality printing, noisy and very slow). Then came the dot matrix printers, specially designed for computers. (Medium quality printing, not so noisy and much faster). Over the years, the typewriter style has become the daisy wheel printer and although greatly improved, it has been left far behind with the quality, speed and versatility of modern dot matrix printers.

Most word processors, including BrunWord 6128, can use dot matrix and daisy wheel printers. This creates the need for a style of printer control that is acceptable to two very different types of printers.

BrunWord Elite does not have this restriction as it is specifically written to be used only with dot matrix printers. This gives it a unique advantage over other word processors and as a result it is able to provide much more advanced printer control.

This is taken even further, as BrunWord Elite is supplied with an 8 Bit Printer Status Port which allows the programme to continuously monitor the status of the printer, (as well as providing the missing 8th bit for the original CPC6128). This means that BrunWord Elite is able to respond in a more sophisticated way than normally possible. It will wait for ON LINE or <ESC> if the printer is initially OFF or OUT OF PAPER but automatically returns to the editor if the printer is turned OFF.

24 Pin Fonts

Before we designed the fonts for BrunWord Elite, we studied several good magazines and concluded that the bulk of the text was printed in fonts that derive from two basic themes. Our fonts Fineline and Finetype are variations of these two styles, optimised for dot matrix printers. Fineline is supplied in three sizes and Finetype in two sizes. To these we added a display font in computer style type and a straightforward 'Heavy' font. Altogether there are 7 fonts supplied, four are full 24 pin fonts, two are middle size 21 pin fonts and one is a small size 16 pin font.

BrunWord Elite Features

All the features and speed of BrunWord 6128 and BrunSpell, plus:-

*Print in columns *Specify page layout *Use special high quality proportional fonts *Use advanced micro justification with proportional text *Set printer margins independently *Move print head up or down paper, specified in inches from top *Set micro line spacing within text *Print line or box by specifying size and line thickness *Use absolute TABs with proportional text *Download a file directly from disc during printing. *Can be supplied with Info-Script for data merging.

Headline

Headline is a print enhancement utility specially designed for use with low cost 9 pin printers. It enables virtually all the features of BrunWord Elite, including the 24 pin fonts, to be used with any 9 pin Epson compatible printer. The only requirement is that the printer must have quadruple graphics (all well known modern 9 pin printers). Even printers which do not have double height printing will be able to use all the features of Headline, including micro justification, normal, double and eight times height, and 1 to 9 times width

9 Pin Elite £55

BrunWord Elite, BrunSpell, Headline, an 8 bit printer status port and 7 'type setting' fonts (fonts are 24 pin in size but only for 9 pin printers). Total price £55.00 inclusive.

9 Pin Elite+Info £92

As above but including Info-Script and a backup disc. Total Price £92.00 inclusive.

24 Pin Elite £90

BrunWord Elite, BrunSpell, Info-Script, back up disc, an 8 bit printer status port and 7 'type setting' fonts for downloading to a 24 pin printer. Total price £90.00 inclusive.

Info-Script

Complete Data Processing Package £50

Info-Script includes BrunWord 6128 and BrunSpell. The word processor and database can be resident together, giving the convenience of access to both programmes with no disc delays.

Info-Script is written around the full BrunWord 6128 word processor, enabling many routines to be common. This makes a very compact combination and allows both programmes, 6 pages of text and 1000 addresses to be in the memory at the same time using a standard CPC6128 (or 6128 plus). The great advantage of this is the speed and convenience of no disc delays.

Database Features

*Very fast (e.g. takes 1 second to search 2000 addresses for surname 'Smith', initial 'B'). *Specific field search and/or progressive general search. *Instant sort on any field, alphabetical, numerical, date or reverse order (zero time as the data does not move). *3 sets of user defined headings for each file. *4 markers for instant selection, plus one temporary marker. *Markers can be cleared or inverted and any pair can be added (allows complex searches to be quickly and easily performed). *No setting up of field type or length. *Efficient storage. *Relational records, Parents, Sons and Daughters. *Field to field arithmetic. *Direct data merging into BrunWord. *Easy direct label printing, 1 or 2 across, left of 2 or right of 2. *Single or multi-step.

Data Merging Features

*Simple intelligent system, &N &A &D construct full name, full address and date. *&1 &2 etc specify individual fields. *Insert or fixed format merging. *Automatic justify after merging. *Single step (see before printing) or multi-step. *Stop any time, go to word processor, restart same place. *Merge data from several records for summary, invoice, purchase order etc. *Arithmetic. *Running total. *VAT total. *Conditional loading. *Conditional printing. *Repeat patterns.

100 Letters £15

100 Letters is a utility for use with Info-Script, enabling pre-written letters to be easily selected and personalised. It is supplied with a library of 50 letters but even the most cautious users will be able to write simple letter patterns to expand the library to '100 Letters'. If multi-purpose patterns are used then the upper limit depends only on the skill of the writer. A third type of letter pattern, aimed at solicitors, doctors, school teachers, estate agents etc, consists of up to ten pre-written paragraphs. The user indicates which of the paragraphs are to be used. 40 separate letters can be added using this style.

Send cheque/PO/Access number/Visa number to:

Brunning Software
138 The Street,
Little Clacton, Essex, CO16 9LS
Telephone (0255) 862308



BrunWord 6128 with BrunSpell & DataFile. . . £30.00
Info-Script with BrunWord 6128 & BrunSpell. . £50.00
9 Pin BrunWord Elite £55.00
9 Pin BrunWord Elite with Info-Script. £92.00
24 Pin BrunWord Elite with Info-Script. £90.00
100 Letters (needs Info-Script). £15.00

Supplied on 3in Disc for CPC6128 or CPC6128 Plus.
You must state which computer.

All prices are inclusive for UK. Overseas orders sent insured air mail - Europe add £2.50 : Rest add £7.50

BrunWord

BrunWord ROM

In our advertisement many months ago we said 'the ROM project is not completely dead'. Since then the price of large capacity ROMs has fallen dramatically. ***We can now announce that BrunWord Elite will be released on ROM within the next few months.***

The BrunWord ROM Module runs onto 16 ROMs. That's twice the size of the 6128 cartridge! On the ROM we have BrunWord Elite, Headline, 10 fonts for Headline (including 'Chelmer' and 'Clacton'), 8 fonts for 24 pin downloading, BrunSpell, 30,000 word dictionary and Info-Script. Needless to say, we had to invent a few new tricks.

The New Power

Imagine plugging a 256K memory pack onto your computer that's already loaded with programmes, dictionary and fonts. That's the BrunWord ROM module. Suddenly your CPC6128 or 6128 Plus becomes a CPC 384K and it may not end there as we have an outline design for a two megabyte non volatile memory pack.

Draw a breath and consider what this means. At its simplest, switch ON type ¦BRUNWORD and immediately start typing into the word processor, check the spelling and print it out, all without a single disc operation. At the other extreme, load 1000 names and addresses into Info-Script, then write a letter in BrunWord, check the spelling and do a mail shot using a 24 pin printer with downloaded fonts *and* enhanced high quality headings using Headline fonts. The only essential disc operation being loading the names and addresses.....

The Cost

Why do all this on the humble CPC? Why not! the CPC is a great computer, far more friendly than any PC and in the end the power of any computer is its software.... What has all this to do with price? Add the cost of a 256K memory pack to the cost of BrunWord Elite and BrunWord on ROM will look very good value indeed! Compare to the price of PC programmes and you will be bowled over. That's all we can say.

Buy or Wait

Words that are saved during a spelling check are saved to normal memory not to ROM. This is no problem as each of your discs will have a small file that contains all the 'unknown' words for that disc. However, some words would be more convenient if stored in the permanent dictionary. So, if you own BrunWord (late Oct 88 onwards) then the price to update to BrunWord ROM will include programming your personalised dictionary into the ROM. You can't loose. The combined price to buy now and upgrade to ROM, will be less than the combined price to buy the ROM and update your ROM dictionary later.

Very Serious

BrunWord ROM is perfect for the basic machine. You need no other add ons. Most of the time the disc drive will be silent, so a second drive or extra memory are pointless unless you have a particular requirement.

Having said that, very heavy business use such as we give the programme at Brunning Software, could well need various attachments. A 256K Dk'Tronics memory can be added to expand the available memory for Info-Script and a second 3 inch or 3.5 inch drive can be added. BrunWord ROM has some very special features for these add ons. For a flavour, lets just say that a 256K file can be loaded into Info-Script in 16 seconds from a 3.5 inch drive. To do this you need no extra software, just the BrunWord ROM module and a 3.5 inch drive (and extra memory for Info-Script). Another brilliant feature for second drive users must, for the moment, remain for us to use and you to wonder, but a better arrangement for a second drive will not be found on any computer.

Finally, ROM slots 4 to 7 are available for any other expansion ROMs and BrunWord ROM has warm start procedures so that a complementary background ROM can be visited, without loss of data in BrunWord or Info-Script.

Evaluation models are out, so watch for the review in ACU.

BrunWord 6128 £30

Complete word processing package with word processor, spelling checker and card filing programme. BrunWord 6128 out performs all other word processors for the CPC6128. It's high speed screen routine, gives it a very fast response and the editor features are logically arranged to be easy to learn. The spelling checker, with its dictionary, load into memory at the same time as the word processor, making access very convenient and exceptionally fast. It is supplied with a 40 page manual and an introductory tutor file.

Info-Script £50

Complete data processing package, including all the features of BrunWord 6128 and BrunSpell. The word processor and database can be resident together giving the speed and convenience of common access with no disc delays.

9 Pin Elite £55

The Elite system for 9 pin printers consists of BrunWord Elite, BrunSpell, Headline, 8 bit printer status port and 7 'type setting' fonts (fonts are 24 pin in size but for 9 pin printers). Total £55 inc.

9 Pin Elite+Info £92

The Elite system as above but including Info-Script and a backup disc. Total price £92 inclusive.

24 Pin Elite+Info £90

BrunWord Elite, BrunSpell, Info-Script, back up disc, 8 bit status port and 7 'type setting' fonts for downloading to a 24 pin printer. Total £90 inc.

BrunWord Elite Fonts

Printed using low cost 9 Pin Printer & shown 70% actual size

Fineline Our Fineline fonts are the sharpest characters that the printer can produce and three sizes are supplied with BrunWord Elite. This 24 pin size is the largest.

Finetype Our Finetype fonts are two pins thick on the vertical, shaped down to one pin thick on the horizontal. Two sizes are supplied.

Comput Comput is a display font designed primarily for main headings. It can be rather overpowering in large paragraphs.

Heavy Last of our standard fonts is 'Heavy'. This has a similar outline to Fineline but with a thicker line. It can be used for ordinary correspondence.

Chelmer Our most sophisticated font. Mathematical uniformity, contoured thickness, Chelmer is a true aristocrat among fonts.

Clacton *In total contrast 'Clacton' is a relaxing flowing, seaside font, inspired by the local resort and based on characters hand drawn by Peter Brunning.*

Chelmer and Clacton are optional extras and can only be printed using Headline.

Send cheque/PO/Access number/Visa number to:

Brunning Software
138 The Street,
Little Clacton, Essex, CO16 9LS
Telephone (0255) 862308



BrunWord 6128 with BrunSpell & DataFile. . .	£30.00
Info-Script with BrunWord 6128 & BrunSpell. .	£50.00
9 Pin BrunWord Elite	£55.00
9 Pin BrunWord Elite with Info-Script.	£92.00
24 Pin BrunWord Elite with Info-Script.	£90.00
Elite Font Editor with 'Chelmer' & 'Clacton'. .	£25.00

Supplied on 3in Disc for CPC6128 or CPC6128 Plus.
** You must state which computer. **

All prices are inclusive for UK. Overseas orders sent insured air mail - Europe add £2.50 : Rest add £7.50

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REGULARS

FEATURES

FAIR'S FAIR



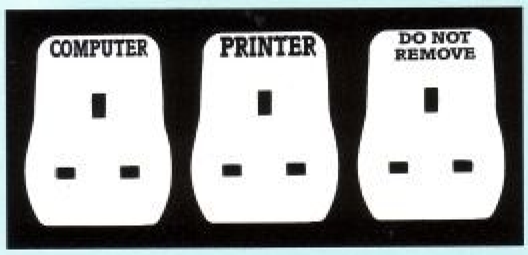
Following on from the phenomenal success of the first All Formats Computer Fair outside London, up in Solihull, plans are afoot to make this incredibly popular affair accessible to an even greater audience.

With fairs planned for Leeds and Bristol later in the year, to start the ball rolling, where better to keep up to date on fair news than your own special news hotline.

Each week, Bruce Everiss, the fair's organiser, will keep you updated on the latest events on a new 3 minute message on 0898 299 389.

That should keep you up to the minute on the fair's movements and, if you recognise this number as being one of the Mega Hot Computer Lines numbers, you wouldn't be far wrong. For those of you who already use these lines`, including Mel Croucher's Fun Line, why not send off for a free wallet card, to help you to remember all of those important numbers.

Just send an SAE to: Bruce Everiss, PO Box 71, Kineton,Warwick, CV35 0XA. Once the Fairline number is included on the list, the wallet card will become an invaluable addition to your credit cards. Write off and get yours now.



TAG TIME

Whatever will they come up with next? Well, York based Identiplug UK, has come up with a very novel idea indeed, and it's not a bad one either.

How many times have you gone to remove your printer plug, only to find you've accidentally pulled out your CPC plug instead, very possibly crashing that important file you were working on.

Well, relief is at hand in the form of some very clever labelled plug markers. Simply slip them over the pins of your computer, printer, or peripherals plug and you'll never come unstuck again. With a handy Do Not Remove marker included in the list of over 60 titles available, these little beauties should be a must on any overloaded socket.

At just 35p per tag, the price is smart as well, so keep your eyes peeled for these little beauties, or try ringing Identiplug on 0904 490282 for more details. How's that for a plug. Ha, ha!

SPREADING THE WORD

Time to brush up on your Bible knowledge, folks, with a chance to pick up some tasty prizes to boot.

Surrey-based Evangeltrust, the charity which produces well known Christian orientated computer games on its Evangelsoft label, is organising a nationwide competition to write an original piece of Christian software, such as a computer game, a Bible study aid, database, or some other item specifically for use by RE teachers, ministers and other church workers, youth groups etc.

With a section for CPC users, prizes of cash or software are being offered in four categories, for the under 15s, over 15s, single entries or group entries, as well as an additional cash prize for the best overall entry.

Organiser Dr Ken Dean of Evangeltrust said of the scheme: "The competition makes an excellent project for a church youth group, Sunday School or house group. All it needs is one or two people with simple programming skills, plus the enthusiasm and organising abilities to see it through."

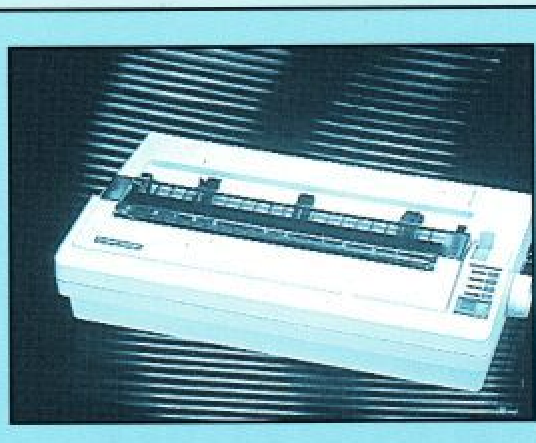
So, if you want to win some great prizes, get to work on your project now. The closing date is December 31 and, if you want all the details and an entry form, write to Bible Software Competition, Evangeltrust, PO Box 224, Kingston-Upon-Thames, Surrey KT1 2NX, enclosing a stamped, self-addressed envelope.

Good luck, and we'll keep you informed of the progress of the competition.

SWIFT ARRIVAL

Adding to the ever popular line of 9 and 24-pin printers from Citizen, the new Swift wide carriage 9X impact printer looks set to be a worthy successor on the shelves.

Specially designed for users requiring wide format or spreadsheet printing, the 9X offers 136 column impact printing, with maximum speeds of 213 cps, with average speeds of 160cps in draft and 40cps in NLQ mode.



With an exceptional high resolution of 240 dpi, wide compatibility and an optional colour kit, offering seven colour printing, the 9X is superb value at just £329.

The optional colour kit will set you back £41, with a serial interface costing £25 and a handy stand just £29.50.

Distributed in the UK through Citizen's authorised dealers, if you want to know where you can pick up one of these little beasts of burden, try ringing the Citizen Customer Response Desk on 0895 72621, before popping down for a test drive on one.

MERCS ALERT

Watch out for the latest blast from US Gold to hit the streets. As a member of the elite MERCS group, your task in this superb go get 'em blast-'em-up, is to rescue the former US President, who's been taken hostage by a group of revolutionaries.

Featuring eight levels of nailbiting action, for one or two players, Mercs looks set to be an absolute winner. It should be out on the streets right about now, so make sure you book your copy early.



NEW DOMAIN

Good news for lovers of the CPC and public domain comes in the form of a brand, spanking new fanzine called CPC Domain.

Bursting with news, reviews and top tips for public domain users and lots, lots more, CPC Domain is the work of well-known PD man, Alan Scully, the brains behind Scull PD.

Costing £1.25, the fanzine is excellent value for money from what we've seen of the first issue but, if you want a real bargain, subscribe for twelve months at the cut down price of just £15, and you get a free copy of Pagemaker Deluxe desktop publisher thrown in into the bargain, if you can supply your own disc. If you're a 464/664 owner without the extra 64k ram, you'll get a super PD voucher worth £3 instead. Can't be bad.


CPC DOMAIN

Issue 1 - May 1991
For the Amstrad CPC
(c) Scull PD Library

CONCH REVEALED
The full map

SPLATT! ATTACK
Cartoonzine reviewed

16 V 8
We compare the ST and the CPC

PD SPOTLIGHT
Details on all the new PD disks

STOP PRESS QPRINT
A type-in for TWO fast print modes

AND THERE'S MORE...
Discounters, Postbag, PD Chart, News, Competition, and your 50p PD voucher!

To find out more about CPC Domain and the bargain offers, write to Alan Scully at 119 Laurel Drive, East Kilbride, Glasgow G75 9JG.

FIRST DIVISION SIGNING

Those clever people at Domark have been at the signing table again, this time with Taito, to bring yet another superb coin-op licence to the CPC screen.

Following the successful signing of Super Space Invaders, Taito has now agreed to allow Domark to publish the excellent Euro Football Champ.

Expected to be released next summer, to coincide with the European Football Championships, this superb one or two player action game allows you to select an International team and go for the cup in an excellent knock-out challenge.

With some excellent added features, enabling you to put the boot in on your opposition, look out for this one.



PROTYPE – THE RETURN OF ARNOR!

Did you think Arnor had developed their last CPC product?

We must admit, it was starting to look that way. But now we are pleased to announce a stunning new arrival - *Protype*. This provides *Protext* with the improved printing features that many of you have requested.

We honestly believe that it is not possible to achieve better quality output from a 9 pin printer than with *Protype*. Just look at the examples below - all printed on an elderly Amstrad DMP 2000!

Protype costs just £30 and is available on disc only. It works with *Protext* ROM and disc versions and may also be used as a stand alone program.

5 years after its original release Protext remains indisputably the leading CPC word processor. In the February 1991 issue, AMSTRAD ACTION said:

> *"Without doubt the most complete word processor available for the CPC ... Protext is very much a professional quality program."*

AMSTRAD ACTION speed tests show Protext to be many times faster than other programs, for example:

Replace operation		Delete 17k block	
Program A	- 94 secs	*Program A*	- 17 secs
Program B	- 74 secs	*Program B*	- 15 secs
Protext	- 5 secs	*Protext*	- 1 sec

Prices

Protype	£30	(disc, Protext not required)
Protext + Protype	£45	(disc)
Rombo ROM box	£20	(when at least one ROM is purchased)

ROM prices

Protext	£25	Promerge Plus	£20
Maxam	£25	Utopia	£20
Prospell	£20	Maxam 1½	£20
		BCPL	£20

Liquid[293K]	c_p/J kg^{-1} K^{-1}
① Acetic acid ($C_2H_4O_2$)	$1{\cdot}96 \times 10^3$
② Acetone (C_3H_6O)	$2{\cdot}21 \times 10^3$
③ Water$_{sea}$ (H_2O, salts)	$3{\cdot}90 \times 10^3$

Protype is a typesetting print enhancer designed to squeeze maximum quality from low-cost 9 and 24-pin dot matrix printers. This paragraph shows how **Protype** can work to a right-hand margin.

[A] **Ganga común, «*Pterocles alchata*», 38cm**
♀ con tres bandas en el pecho †
♂ faja pectoral castaña ‡

supports over 40 European languages including:

Anglo-Saxon	þ ð æ œ ā ē ī ō ū ǣ œ̄
Czech	á č ď é ě í ň ó ř š ť ú ů ý ž
Latvian	ā č ē ģ ī ķ ļ ņ š ū ž
Polish	ą ć ę ł ń ó ś ź ż
Turkish	á â ç ğ ı î ö ş ü

[B] just some of the non-ASCII symbols:
« » „ " " ¡ ¿ 1º 2ª ¶ §
© £ ¥ ¤ ¢ ½ ± ÷ × ↓ °
← → ♯ ♭ ß ð Đ þ Þ ø Ø
å Å æ Æ œ Œ ł Ł đ ħ Ħ
←line graphics too→

This actual-size printout was produced <u>in one operation</u> on a 9-pin printer using Arnor's Protext and **Protype**.

Protype (disc only) works on:
- ○ Amstrad CPC6128 [+]
- ○ **CPC664 & 64K expansion**
- ○ **CPC464 & 64K expansion & disc drive**

Uses less than 350 bytes of the main 64K.

PROTYPE IS VERSATILE:
- *multiple diacritics (accents) with any letter* (ệ ñ̄ ş̃ Ā̧)
- *tabulates proportional text / micro-justifies spaces*
- **240 DPI × 216 DPI** *resolution on a 9-pin printer!*
- *works with all 9-pin or 24-pin Epson-compatible printers*
- *use from Protext, Basic or machine code*
- *includes the seven fonts used in this demonstration*
- *choice of character designs within a font* (page or page)
- *mirror imaging of a line of text!*
- ^{super}*script*, $_{sub}$ *script*, <u>*underline*</u>, [b] *box*, ⓔ *encircle*
- *kerning (spacing of 'difficult' character pairs* (AV)

Fæðer ūre, þū þe eart on heofonum	(Old English)
Ár n-atheir, atá ar nèamh	(Irish Gaelic)
Fader vår som är i himmelen	(Swedish)
Svargayehi vädasitina apagē piyāṇeni	(Sinhalese)
Teve mūsų, kurs es danguje	(Lithuanian)
Pater noster, qui es in cælis	(Latin)

Releasing your micro's potential... ARNOR

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ZIGGY'S MAILBOX

THE COMPUTER WORKSHOP TAKES ALL THE FLACK

A slight departure from the normal letters' layout this month, as we take in a letter from the heart from one of ACU's long-running advertisers, The Computer Workshop. Read on...

"I would like to start by saying thank you to all of the readers that wrote to me complaining about an advert that has been running in the computer magazines, advertising a Manual on starting your very own home based business.

This Manual offers in its price four VIABLE ways of earning money from your micro computer. THE WORD VIABLE MEANS: (Born alive and sufficiently developed to live; capable of living or growth). THE WORD MANUAL MEANS: (something that was written or made by hand, into a handbook or small text-book). Yes, he is right in saying that he has a Manual to offer, in as much as it was probably written by someone, be it him or someone else. As for it being a Text, this is not quite true in it's sense, a Text is a form of instruction, NOT ADVICE.

About a month ago, one of my customers, a Mr Ogden from Stafford, wrote to me complaining about this person. He apparently sent approximately £13.00 off to purchase this manual. After he had received it, he was totally devastated by the information within the covers. He even asked for his money back but was told NO, by this horrid man.

This so called Manual did nothing to fire his imagination in looking towards starting a Home Based Business. In fact, it made him so angry that when he saw MY ADVERT, he attacked me with an enquiry into the authenticity of my Manual, complaining that he had been ripped off by purchasing this other Manual, nine pages of photo copied rubbish, and would I return it to him because he, and I Quote "needed something to light the fire with!" Unquote.

Mr Ogden, like so many that had been misled by this Advert, had the impression that I was about to do the same. Before he was prepared to buy my Manual, he wanted reassurance from me that his money was to be well spent. Like so many other complaints that I had received, this man was not about to make the same mistake again, and who can BLAME HIM.

Mr Ogden gave me this Manual at my request, so that I could look into the feasibility of it helping people start up a business. The short answer is NO, but if you were to buy all the literature that it has on sale within it's covers, totalling approximately £150.00, then yes, it is possible. But who would spend all that money on a gamble?

Starting a business within this recession is gamble enough for people to take, but if you have good advice and are told and shown how to start, then that gamble can and will become a nice challenge, especially if you start that business on a part time basis, and the cost of that knowledge is about the same price as a computer game. What more could you ask for?

A computer, be it small or large, is a marvellous piece of machinery, it will do whatever its programmer tells it to do, but its operator needs only the basic knowledge to help it perform its task. Most computer enthusiasts have that basic knowledge, and most already have the hardware and software to start a business, all they need is a push in the right direction, and an explanation on how to use their equipment. My Manual will give you that push. It is powerful in its design, and shows you how to set your business in motion. It lists over twenty ways of making money from your computer, it shows you how to set those ideas together as a business, and if you have the staying power, you will start a business, be it part time, full time, or even as a paying hobby. But at the very least your computer will support itself.

I would like to give you some sound advice regarding starting a home based business. Like it or not you must inform your local Tax Office of your intentions, the service that you are providing and the date you intend to start. From day one, keep an account of all your outgoings and income, so it can be presented to the Inland Revenue. If you are not too sure, you can get the help of an Accountant, most Accountants charge approximately £120.00 per

year. Your local Tax Office can supply you with leaflets explaining just what you can claim for.

If you are unemployed and claiming either Income Support or Unemployment Benefit, talk to your local Job Centre. You will get free advice on starting a business and you can claim for The Enterprise Allowance Scheme, whereupon if you can show one thousand pounds in your bank account, they will contribute £40 per week for the first year, paid direct into your account. If you have a family to support you can claim for Family Credit, this is paid to you by way of a weekly allowance book. This is reviewed every six months until your business is making enough profit to keep you and your family. If you wish to claim the latter I would advise you to seek the advice of an accountant.

Jim Bunt, Computer Workshop.

Ziggy: Well, there you have it. Starting up a business of your own is certainly no easy matter, as Jim wisely points out. The last thing you need, once you've taken that all-important decision to give it a go, is an extra drain on your pockets, going off on a wild goose chase.

As Jim suggests, there are plenty of points of information and assistance for those of you willing to give your own business a try and, when all is said and done, there are indeed many ways of making your CPC work for you.

If you want to have a go, simply pay out and receive a manual that will certainly list plenty of ideas to help you on your way, or if you want to get hold of other valuable information regarding setting up your own micro-based business, then send an SAE to Computer Workshop, Dept 7, PO Box 111, Rochester, Kent ME2 2TS, or try calling on 0634 710941.

SERIAL BLUES

I'm thinking of buying a modem. I've looked through my ACU and the order form for the Amstrad User Club and found one within my price range. However, I can't find anywhere to buy an RS232C interface and serial lead. All the shops near me sell nothing but software, so could you tell me the address of someone I could write to.

I think ACU is the best magazine out, but the new BASIC series isn't as good ad Jeff Walker's Basic Tutor.

Thomas Huns, Burton Joyce, Nottingham

Ziggy: Well, if you've managed to locate a modem through the User Club, why not give them a buzz on 091 510 8787 and let them fill you in on where you can get an interface. They should sort you out fairly quickly. On to your second point, Ooer, what flattery, I've gone all red. Seriously though, our present BASIC tutorial, aimed at giving an overall grasp of the subject, is nearing an end now, and our next project will be to allow you, the readers, to come back to us with your problems concerning BASIC, allowing for deeper coverage as and where it is most needed. How does that sound? We are, also, processing the old reader surveys at the moment, so that should help us to pinpoint exactly where help is most needed.

So, if you want something different, why not write and tell us what you want? We may even be able to oblige!

BAD MODULATIONS

Three or four years ago, I purchased a CPC 6128 with mono monitor, (I couldn't afford the extra £100 for a colour one).

I did so in the confidence that at some stage I would be able to buy a piece of hardware called the MP2 Modulator. I was confident because the user instructions that came with the computer told me so. In a more recent edition of the user instructions, which I have seen, this is still stated to be the case.

I now gather, however, from one of your advertisers, that the MP2 Modulator is no longer in production and will probably not be produced in the future.

I have written to Amstrad (for the second time – I have had no reply to my first letter) to try and find out what the actual position is. I have said to them that if the intention is to encourage people in my position to buy a new computer, they can be sure that the next computer I buy will not be an Amstrad.

John Hodgson, Banstead, Surrey

Ziggy: As many of us know, the trusty CPC was one of the earliest microcomputers on the market, and one of the very few to survive those early years, through to today, and still be incredibly popular.

The problem is, that in the early days, many microcomputers were designed for use with a TV and thus, the CPC had its own modulator, allowing people to do just that, avoiding the cost of a, then, expensive monitor.

However, as microcomputers have progressed, one of the trends has been to promote the all-in one kit, so to speak, with the monitor becoming very much part of the package. Because of this, demand for the old modulator has diminished, making it unfeasible for Amstrad to produce it on a commercial level.

This, of course, does not help yourself, or many others wishing to plug into the colour TV, but it is not part of an organised push to make people buy different computers.

Although MP2s are difficult to get hold of now on a large scale, there are still some floating around. Why not try the Bits'n'Pieces section for a second hand one, or pop along to the next All Formats Computer Fair up in Victoria. You should pick one up there, fairly cheaply. Fair enough?

STRIKE A CHORD

Two years ago, I was working as an in-house musician for a software company. One of the games soundtrack programs I used on the Amstrad 6128 was Music Box by Mark Time.

I have since left that company and am working self-employed, writing games soundtracks. I have been able to find games music software for all formats apart from the Amstrad 6128+. I would like to know if there is any software available for this computer or if any readers could help me.

A. J. Madden, 19 Caryl Grove, Dingle, Liverpool L8 6RN

Ziggy: Hhm. Tricky question indeed. You might try Datel for a start, on 0782 744707. Alternatively, your best bet may be to hunt around the PD scene, to see what turns up there. How about you others out there? Does anybody know where Alun might be able to get his hands on some music software? Write and let him know, it should make his day.

COMPETITION



Glove up and get set for some truly fabulous baseball goodies in this month's super compo, courtesy of Domark.

Just for you lucky people out there, there are five incredible first prizes of a baseball bat and ball, while for the ten runners up, there are some fabulous rubber bats and baseball hats to be won.

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Simple.

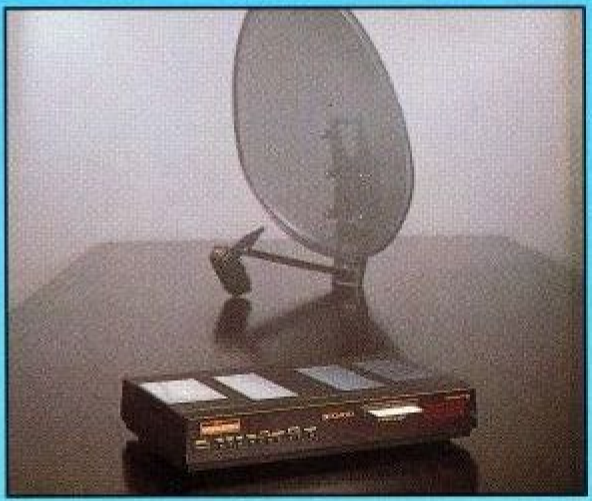
Just send in a drawing of how you'd like to look on the baseball park. All you need to do, is draw a baseball shirt, designing your very own team logo on the front. Using their expert opinion, the ACU team will decide who's going to be walking off with these fantastic prizes.

Send your drawing to:

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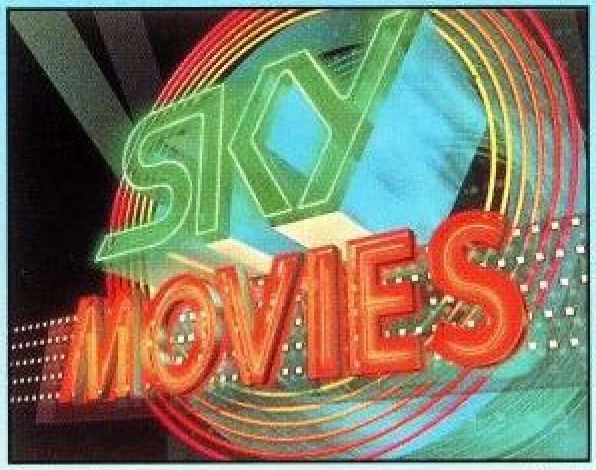
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Readers in Scotland and Northern Ireland may need the larger and more powerful SDX80 80cm dish which we are offering at £379.95 - still the best deal around! (Includes installation and 12 month onsite warranty.) Before installing a dish, you may require the consent of (where applicable) your freeholder, landlord, resident's association or others. If your property is listed, or in a conservation area, you may need planning permission from your local authority, or special rules may apply. **A credit facility is available on our offer.** Instalation available in mainland U.K and N.Ireland. **Closing Date 31st October 1991.**

ACU

ROCK STAR

BY DAVID HALL

This is it! Your very own Karaoke machine on your CPC. Well, very nearly anyway. This excellent routine allows you to enter and save as many song lyrics as you like, so budding collectors of famous songs, start here. When you've entered your lyrics, simply press option three, plug in your joystick, turn on your ghetto blaster and use the joystick to scroll the lyrics across the screen, allowing you to keep up with your fave sounds.

Simple, but effective, this one's guaranteed to break the ice at parties.



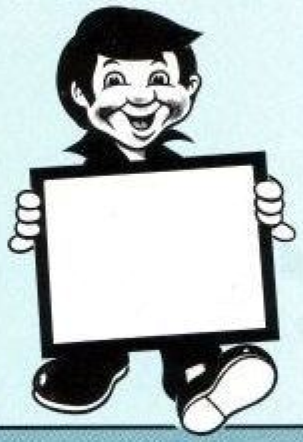
```
1 m$="Song Lyric Generator":n$="/\/\/\/\/\/\/\/\/\
/\":INK 0,0:BORDER 0:PAPER 0:gr$="nobody":na$="not
hing":POKE 20001,255:IF PEEK(19000)=0 THEN SYMBOL
AFTER 31:MEMORY 14999:l=19000:READ a$:FOR t=1 TO L
EN(a$) STEP 2:POKE l,VAL("&"+MID$(a$,t,2)):l=l+1:N
EXT
2 MODE 1:PEN 1:LOCATE 10,4:PRINT "I WANNA BE A ROC
K STAR":FOR t=1 TO 3:MOVE 126+t*8,350+t*4:DRAWR 38
8-t*16,0,t:MOVE 126+t*8,338-t*4:DRAWR 388-t*16,0:N
EXT:LOCATE 7,9:PEN 3:PRINT "(1)...LOAD lyrics":LOC
ATE 7,12:PEN 2:PRINT "(2)...TYPE-IN lyrics"
3 na$=UPPER$(MID$(na$,1,27)):gr$=UPPER$(MID$(gr$,1
,27)):LOCATE 7,15:PEN 1:PRINT "(3)...'Let's ROCK d
udes !'":LOCATE 3,20:PEN 2:PRINT "SONG: ";:PAPER 3
:PEN 0:PRINT " '"na$"' ":PAPER 0:PRINT:PEN 2:PRINT
 "ARTIST: ";:PAPER 3:PEN 0:PRINT " "gr$" "
4 w=20000:i$="":PAPER 0:a$="++ Select 1-3 ++":LOCA
TE 13,24:PEN 2:PRINT a$:a=6:b=26:c=14:WHILE i$<>"1
" AND i$<>"2" AND i$<>"3":i$=INKEY$:d=a:a=b:b=c:c=
d:INK 1,a:INK 2,b:INK 3,c:e=RND*4000:SOUND 1,e:SOU
ND 2,e+1:FOR t=1 TO 300:NEXT:WEND:z$=""
5 IF i$="1" THEN CLS:LOCATE 5,13:INPUT"LOAD File:
",a$:OPENIN a$:INPUT#9,na$:INPUT#9,gr$:CLOSEIN:LOA
D a$+".bin":GOTO 2 ELSE IF i$="3" THEN GOTO 8 ELSE
 MODE 2:PEN 1:PRINT TAB(31)m$:PRINT TAB(31)n$:PRIN
T:INPUT"SONG:",na$:PRINT:INPUT"ARTIST:",gr$
6 l$="":INK 1,16:PRINT:PRINT"Type in lyrics (press
ing RETURN after each line & 'Z' to end)":WINDOW #
1,2,79,10,24:PLOT 4,260,1:DRAWR 632,0:DRAWR 0,-250
:DRAWR -632,0:DRAWR 0,250:g=1:WHILE LOWER$(l$)<>"z
":LINE INPUT#1,"",z$:l$=z$:z$=STRING$(6,32)+UPPER$
(z$)
7 GOSUB 10:WEND:z$=" ":w=w-1:GOSUB 10:z$="*** SONG
 OVER ***"+SPACE$(56):GOSUB 10:POKE w,255:MODE 1:P
EN 3:INPUT"SAVE name or <ENTER>:",a$:IF a$="" THEN
 2 ELSE OPENOUT a$:PRINT#9,na$:PRINT#9,gr$:CLOSEOU
T:SAVE a$+".bin",b,20000,w-19980:GOTO 2
8 MODE 2:PEN 0:INK 1,6:PAPER 1:LOCATE 10,13:PRINT
na$;:PAPER 0:PEN 1:PRINT " by ";:PAPER 1:PEN 0:PRI
NT gr$:PAPER 0:PEN 1:CALL &BB18:CALL 19000:INK 1,1
6:WHILE PEEK(40020)<255:IF INKEY(47)=0 OR INKEY(76
)=0 THEN CALL 19006
9 WEND:INK 1,6:FOR t=1 TO 2000:NEXT:GOTO 2:DATA 21
204E22409CCD19BD2171C30608C5545D1BE501A000EDB0E1CD
8A4AC110EF2A409C7ED61F4721F49F1108001910FDEB21BFC3
0E081A32744A06023600CD8A4A10F9130D20EF2A409C232240
9C7E32549CC97CC60867D0D51150C019D1C9
10 FOR t=1 TO LEN(z$):POKE w,ASC(MID$(z$,t,1)):w=w
+1:NEXT:RETURN
```

BOX

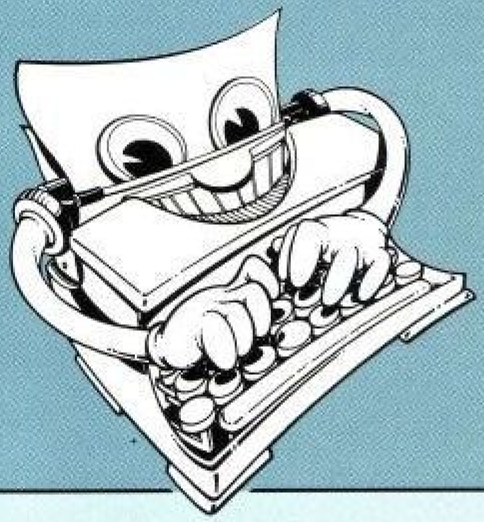
BY JASON HOOD

Another little routine from Jason, this one allowing you to create a box on the screen. Very handy for incorporation with other proggies this one. Run it by typing :BOX and experiment.

```
10 i=&B000:FOR j=0 TO 6:READ a$:FOR k=1 TO LEN(a$)
 STEP 2
20 POKE i,VAL("&"+MID$(a$,k,2)):i=i+1:NEXT:NEXT:CA
LL &B000:¦TON
30 PRINT:PRINT"Typewriter routine installed.":PRIN
T:PRINT"¦TON,s to turn it on. s signifies the
    speed and if it is left out will        defau
lt to 15000.":PRINT:PRINT"¦TOFF  will turn the rou
tine off.":PRINT
40 DATA 2153b00143b0c3d1bc2128b022d4bd
50 DATA b7200311983aed532bb03e012157b0
60 DATA c3bcbc214a1322d4bdc9e5f521983a
70 DATA 2b7cb520fbf1f5fe202806215bb0cd
80 DATA aabcf1e1c34a134bb0c309b0c321b0
90 DATA 544fce544f46c60000000000010f01
100 DATA 070101013200010a0100
```



TYPEWRITER



BY JASON HOOD

It's nice to see some contributions from our Antipodean friends, and Jason's sent in a couple of real gems to wile away a few minutes this month. This is a clever typewriter routine, which will turn your CPC into, well, a typewriter. Actually, what it does, is affect the character to screen speed, giving a jerky, typewriter feel to it. This proggie's been written on a 464 so, to run it, type :TOFF, or you'll end up getting frustrated.

```
10 MEMORY &8FFF:i=&9000:FOR j=0 TO 7:READ a$:FOR k
=1 TO 30 STEP 2:POKE i,VAL("&"+MID$(a$,k,2)):i=i+1
:NEXT:NEXT:CALL &9000
20 CLS:PEN 3:PRINT CHR$(22)"1":LOCATE 2,9:¦BOX,36,
4:PEN 1:PRINT"   ¦BOX,l,h where l is the length and
 h           is the height.":PEN 3:LOCATE 11,14:
¦BOX,18,1:PEN 1:PRINT"Isn't this pretty?":PRINT CH
R$(22)"0"
30 DATA 016e90217790c3d1bcdd6600dd6e02
40 DATA 3e96cd5abb453e9acd5abb10fb3e9c
50 DATA cd5abb44cd53903e95cd5abb10f6cd
60 DATA 53903e99cd5abb45cd5b903e9acd5a
70 DATA bb10f6cd5b903e93cd5abb44cd6190
80 DATA 3e95cd5abb10f6c9cd69903e0ac35a
90 DATA bbcd6990c35abbcd69903e0bc35abb
100 DATA 3e08c35abb7390c30990424fd80000
```

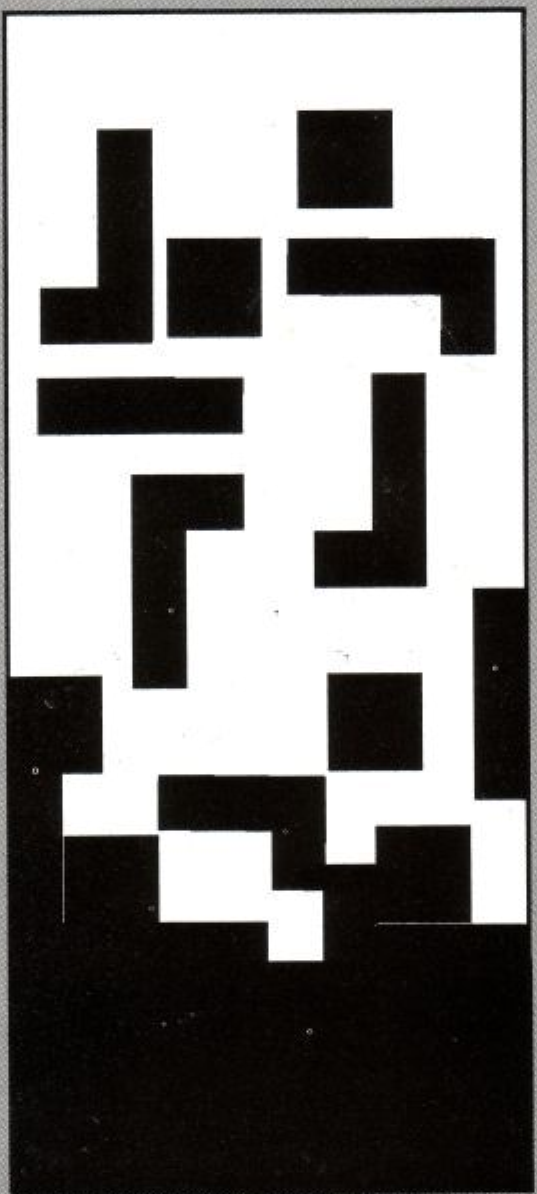
TENTRIS

BY GEORGE FAGG

Some tremendous programming has brought you this fabulous 10 liner version of Tetris. However, you'll have to be pretty nifty to program this lot in exactly right, which is what you'll need to do, taking especial care with the upper and lower cases. As a note of warning, this program must be saved before running, as it might never return from the machine code. Once saved, run it and be patient for exactly 1:08 minutes while the superbly condensed code is poked into memory.

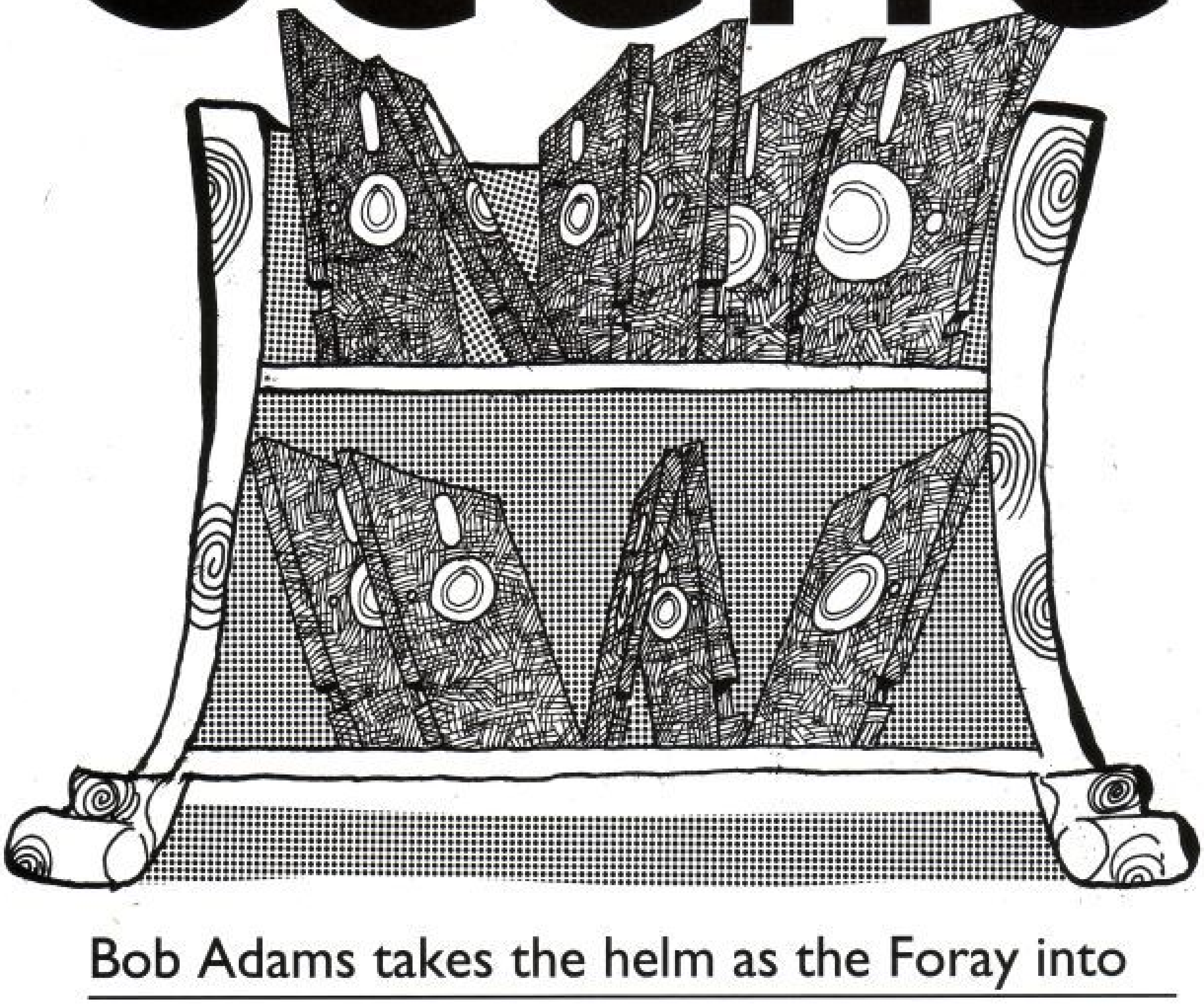
After the wait, simply press a key on the opening screen, then use Z to move left, \ to move right and SPACE to rotate in that excellent game.

If, however, you feel you're not up to the typing, why not write off to George at 21 Northwick Park Road, Harrow, Middx HA1 2NY, enclosing a blank disc and an SAE, as he's promised to copy the proggy for anyone who wants it. Good luck.



```
1 REM "Tentris" by George Fagg
2 REM Save before running
10 c=&3FFD:FOR a=0 TO 9:READ a$:FOR b=1 TO LEN(a$)
 STEP 4:e=0:FOR f=0 TO 3:e=e+(ASC(MID$(a$,b+f))-48
)*2^((3-f)*6):NEXT:FOR f=0 TO 2:g=2^(8*(2-f)):h=IN
T(e/g):POKE c+d+f,h:e=e-g*h:NEXT:d=d+3:NEXT b,a:CA
LL c:DATA "cIM4[1d>_3k8<ZA8YneR8YM88YQ81^LQ062_Mb<
@"
20 DATA "oOH;[ceg8a31?P;=U[\n32H15PX^01hEcDB1cC51c
D118Hh14Ah0iMGUcL2khA5R0MG=m[_A8Bh0iLgf^n7AeLgf^m7
QcOJk8He4[oEnAdoamNG=<[cQ1B<1oPXPkSh1<Z=8<Ye8?P@bW
4R_cKE11PC5>ZA8A1G=\D;14?W14?7=n4;nobPH?P7=]D6_<Z=
8>Ye8?3:MB1SBcARk`odo>Ya8IcZMB6o=4d;]Fj181PC51P@Jo
P0X"
30 DATA "0GLS4a3fcK11`A3]8@1P4@\01P04iB:JB7kn02P7o
_1X5b<Hm>4IO_ko8>S=@44jXdSn0BR\`gU0iMG5N391@b4m@1g
5@RZJB2\12`3U2NGAh@4C0NfhcC51`M7Q6<H66B4:H14;03koM
aT@o<W=3KdR[T7=QT5moP0X1_hD<>hbWTPQ;d?=aD8jUdP1oP[
<cd8bUdPjY4PmoP0X0c:TB3ZIB<f1@CZHB<f1@CZGB<H``eZkk
D^^"
40 DATA "@BZ^@L\Uba@9A4g;9L\DEL\UbaC;9L\D2DA=HRhY]
ne28Zi1b@000@L02LTbXTS=fD4jW4QW?3`1EcZMB51^6LeV^1g
Z@BH0K1HC7QS3I[\Q>D<A4@0jWTQ76A3m8Z18bLdI_BZPB0H@O
^Gn02PGcI2k5R0jXTSn0BP25XmjcEZkhB<@i<TF2AScONDQm5m
74@\06A3mdEXF01W9:Z18iA4@01TjWTSeOS:NB<gI@Ld1@oko:
1Xj"
50 DATA "WTPbWdSahC:NB3h1cKE1>Ym8<Yi8[1>e@O7Q8Z18<
Yi8bCZLB?h1b3dbW4S=0D?e>Ya8?3:LB?7no1Pn0Lfe@CZLB3d
bW4R_`kE1>Ya8?3:LB<d1@oDjW4Pm<Ya81Okob3h1cKE1>Ya8?
3:LB:o3]D7=2K_@oW[:HT;nG<Z;@_hPbRE2bGkno\S=F[\S6?H
jV4P1oP[<gD8bV4R_bCZIB3`bVDR_bCZMB3`bWDS9mCZMB3dbW
DSa"
60 DATA "bLgV@\d1@1?^@SZLB6LjWDQ_cA=2kE^PB0H4a@H4O
_h0:0TJoP0X1<4no1TC8a3^cK11`A3U[1T?0A1>1U=SKg9U7`1
8oQX12P402b0J01<06?h300000`<0000300000000P030`030
`0000000000000100@000@4000400000000000@4100000@4000
0000000000`D0000500001@0000D000061@D51@00000000000
000"
70 DATA "00D600001P0000H60000000020H61P0600000000
00000091PH0000600001P00000000X000H01PH600000000000
01`0700001`001`L00000000<1`0000L71`000000000000d71
`001`0000L0000000003PL71`0000L000000000000;00P000P
82000000000000108000020P000P0000000004@P8200020000
000"
80 DATA "0000000B00P000P800002000000000192@002@T00
000000000004`4H018D1PPJ3`hn0B6;ALf1_<d2_<e>^ch_1P3
=>K\AS`0Q083=Zk\QETK=aD8QWTH108<A7DG=kk`QV4HA0@3E`
LgY_3k8<ZA88@P7cGFk8FY61PEniLf@^n4Sa@H4aGh620hPbdO
4PdKeNLeJ^o7;?a3_`B<@ich:cEZkiCh7cFnkhL4@c\dH^1d2_
<<0"
90 DATA "@??eiLGE?P7=[KcV1oh0:2djY4SFI=cK@\\obco61
3:=AS:FASh?<Xa6?P7=IDDn33:<ASh2cFE5?PC=IDGA`N7an1T
QSdDH2BZ9AC:6AS:?AWknobS]<XU68b:9AB66A_h0c8E5`jZ18
Hm6bHm50@Go1GNcQVX005n6WeVcUP0004]g\eVcUP0004]g\e2
cQUT005n6WeVcUP0004]g\eVcUP0004]g\e2cQUT005n6WeVcU
P00"
100 DATA "04]g\eVcUT\0051gUUVFMe0004]IMe26FD<004]I
LE1oF@0003maFEUoF@0004]IJU26FD<004]ILE1oF@0003mILE
UoF@0004]IJU1aGd\004=3GcaZE3`003a3JSaOBc`003a3McaI
Bd<004^FMe2OQT>6LD^FMe2OQUVcUUnnWo1ISooo`m_K`ooo10
DL00007@00oP5gjJh30A9;ZP02LTnV0`<BCBX20g99ZP<>S1T0
0@00"
```

PD Scene



Bob Adams takes the helm as the Foray into PD land gets deeper and deeper

Over the past few months, Paul Tint has been reporting on the latest programs available from the ever-growing number of CPC public domain libraries. From this month onwards, I will be telling you about not only the latest programs that have been received for review, but I will also be telling you about some of the older PD that I believe should be in your software collection. The suggestions will be based on my personal experience of actually using these programs as a CPC owner.

CPC public domain programs have been around for a number of years and some of the older ones are still as popular and as useful today as when they were first released. Indeed, a great many of the programs began life long before the CPC was even invented and many of them were sold as commercial products. This fact may seem strange but it is true and it is because of a wonderful decision taken by Amstrad, which was to bundle the CP/M operating system in with our favourite computer, alongside the ever-present BASIC, that we are able to take advantage of this situation today. Unfortunately this doesn't apply to all 464 owners unless they have added a disc drive. However, they still have AMSDOS and there are plenty of AMSDOS (ie, BASIC) public domain programs around as well, but for today I want to talk about CP/M.

CP/M, or "Control Program for Microprocessors" to give it its full title, was at one time the MS-DOS of today. As a disc operating system (DOS) it was unique at the time in that it could be run by a variety of different computers. Programmers were able to develop routines and programs on their computer and they were then instantly transportable to be used on different makes of machines. Multi-format compatibility was a reality. However, times change and somebody took great exception to all this freedom and decided to put a stop to it. What they did was to introduce the PC computer to the world, complete with its own non-compatible DOS. The IBM PC was way ahead of the competition and swept the world. Soon MS-DOS dominated the computer world and CP/M was no longer needed.

"Okay Bob,thanks for the history lesson, but what has all this got to do with us?" I hear you ask. Well quite a lot actually. Just because the business world turned their backs on all those lovely CP/M programs that they had been using for years, it didn't mean that they suddenly ceased to exist. Far from it. What happened was that the software authors, knowing that there was still a CP/M user base of home computer owners, released their previously commercial products into the public domain, free to anybody that could make use of them. They are still there and I for one am very glad that they are.

A particular favourite of mine is NSWP (also sometimes called NSWEEP).

NSWP is a utility. Now that bare

```
NSWEEP -   Version 2.07     07/17/1984
           © Dave Rand, 1983, 1984
           Edmonton, Alberta

A - Retag files            :    Q - Squeeze/Unsqueeze tagged files
B - Back one file          :    R - Rename files
C - Copy file              :    S - Check remaining space
D - Delete file            :    T - Tag file for mass
E - Erase T/U files        :    U - Untag file
F - Fine file              :    V - View file
L - Log new disk/user      :    W - Wildcard tag of files
M - Mass file copy         :    Y - Set file status
P - Print file             :    ? - Display this help
X - Exit to CP/M           :    cr, sp - Forward one file

     Drive A0:          50K in 14 files.       128K free.

  1. A0: ACUACT   .BAS    10K  <SP>
  2. A0: ACUADD   .COM     4K  <SP>
  3. A0: ACUCOPY  .BIN     2K  <SP>
  4. A0: ACUDEL   .COM     2K  <SP>
  5. A0: ACUDIR   .BAS     2K  <SP>
  (Etc.)
```

statement doesn't even begin to describe its many features so let me fill in a little more of the detail for you. It is a Directory and File Manipulation Program. With it,you can copy, delete, rename, unsqueeze and squeeze files, either individually or en masse. It comes complete with full documentation which is split into two major sections: A tutorial for the inexperienced, and a reference section. Unlike many CP/M program documents, these are very well written and easy to understand. Having said that, it was in fact a long time before I ever got around to reading the documents, because NSWP has a very good front end and is most intuitive to use. A single key-press menu, lists all the major features and you will probably find yourself using the program as soon as it has loaded. The menu looks like this– (see above).

Once the menu has loaded, you are presented with a report of which drive and user you are logged to, how much space is taken by the files you have specified, how many files have been found with the specifications given, and how much space is left on the disk. As you can see from above, this program can cope with just about every type of disc management operation that you will ever need, but it also has one very important option not normally included on disk/file copiers, even commercial ones. This is the ability to "Unsqueeze" files.

If you have ever obtained an item of software from a PD library, especially if it was down-loaded from a bulletin board, you may well have found that certain files had an odd extension, such as "DQC" instead of the more normal "DOC". If the middle letter is a "Q" then this means that the file has been squeezed and it will need to be unsqueezed before you can use it. With NSWP this couldn't be easier. Have a blank disc ready to receive the new unsqueezed file (it will be a lot larger than the squeezed version) and then press {Q" to tag the original file. After a few prompts, NSWP will dump the unsqueezed file to your new disc. Readers with two drives will find this an absolute doddle.

I mentioned earlier the full documents but I will be surprised if you need to refer to them very often. Just pressing "?" at any time brings up a very useful "Help" screen. This program really does destroy the myth that anything to do with CP/M is not "user friendly". I like and use this program so much that I have had it blown onto a rom so that it is immediately available, along with my CP/M roms from Graduate Software. Most good libraries should be able to provide you with this program. Shop around from the list below for the best price/availability and learn to love your A> prompt.

The following list of libraries are ones that I know can supply public domain programs for the CPC. If you know of any that I've missed or even better, run a library of your own, whether on my list or not and you would like to send some programs in for me to review, then I'd be delighted to hear from you.

Adventure PD
10 Overton Road,
Abbey Wood,
London Se2 9SD

The CP/M & MS-DOS Users' Group
43 Birkbeck Road,
Wimbledon,
London SW19 8NZ

Data PD Library
202 Park Street Lane,
Park Street,
St Albans,
Herts AL2 2AQ

Demon PD
47 Hilton Avenue,
Hall Green,
Birmingham B28 0PE

DW Software
62 Lascelles Avenue,
Withernsea,
North Humberside HU19 2EB

Penguin Software Library
Ruxley House,
28 Mount Hermon Road,
Woking,
Surrey GU22 7UH

The Public Domain Software Library
Winscombe House,
Beacon Road,
Crowborough,
Sussex TN6 1UL

Robot PD Library
2 Trent Road,
Oakham,
Rutland LE15 6HF

Scull PD Library
9 Barra Wynd,
Broomlands,
Irvine KA11 1DB

UAUG Public Domain Library (Disc)
67 Nursery Fields,
Hythe,
Kent CT21 4DS

UAG Public Domain Library (Tape)
2 Wrenbeck Drive,
Otley,
W. Yorks LS21 2BR

WACCi UK
9 South Close,
Twickenham,
TW2 5JE

Also, if there is any particular area of the Public Domain that you would like to see highlighted, then give the Ed a quick note down in sunny Cornwall to set the ball in motion.

DOWN BY THE SEASIDE

In which Chris Knight gets his tongue tied by Peter Brunning in Little Clacton, and doesn't mind a bit.

When I was a youngster, I have to admit that one of my biggest failings was my inability to keep a secret. Thankfully, I've managed to grow out of that bad habit, though I still have a fair few more to get rid of. One of those is smoking, which Peter Brunning had a lot to say about during a recent trip down to the Essex coastline.

Unfortunately, Peter's thoughtful concern for my health has done little to alter my addiction to the evil weed but, the other main topic of our conversation, the latest BrunWord innovation, did more than capture my imagination.

With what can only be termed an extremely smug smile on my face, I think it is fair to say that, thanks to Peter Brunning, I now have something in my office, which you certainly won't have for a little while yet.

At the moment, I can't tell you everything that I know about it and, unfortunately for you lot out there, I'm not about to start spilling classified information here, or Peter would probably never speak to me again.

What is it I'm talking about? Well, if you haven't guessed by now, it's the brand spanking new BrunWord ROM module. And what can I tell you about it? It's totally brilliant.

That's not strictly all I can tell you about it, though. It gives you a weird feeling, listening to a genius talk about his latest creation and, I must admit, there were times when I was left behind as Peter Brunning explained some of the new trickery and problems he has had to overcome to create the module, although the end product more than justifies the time and effort put into its development.

All in all, the ROM module runs onto an incredible 16 ROMs, which means it is twice the size of the 6128 cartridge. Included on the ROM are Brunword Elite, Headline, nine fonts for Headline (including Chelmer and Clacton), seven fonts for 24-pin


Churchwood Computers

BrunWord Elite User,
123 Main Road,

Dear BrunWord Elite User,

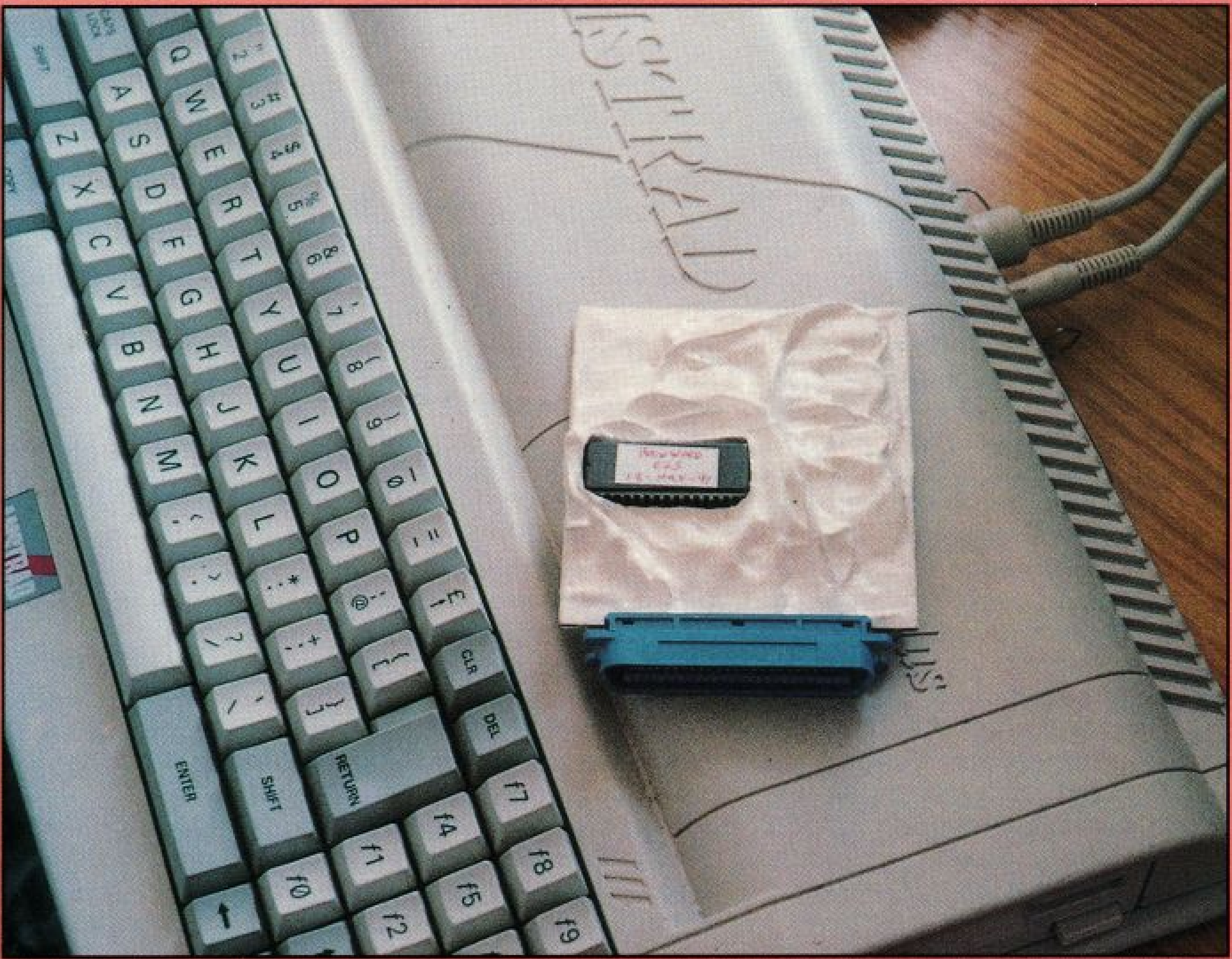
downloading, BrunSpell, 30,000 word dictionary and Info-Script.

With all that on one module, it's hardly surprising that it took some heavy sweat and toil to produce it. What all this means to us punters, however, is that we get an instant 256K memory pack to plug into the back of our CPCs, which is already loaded with programs, dictionary and fonts.

In effect, your 6128, or 6128+, becomes a CPC 384K. The story doesn't end there, though, as Peter is already stirring his mixing pot, with designs for an incredible two megabyte non-volatile memory pack.

Yes indeed, PC users eat your hearts out. At the end of the day, and as Peter Brunning has stressed from the very beginning, our faithful CPCs are far more user friendly than any PC. Ok, so we've had memory limitations in the past but, overcome that little obstacle and the sky really is the limit.

When it comes to the crunch, the power of any computer lies in the soft-



ware and, with this little lot to aspire to, who needs to look any further than what they've already got on their desks?

In its purest form, switch on your CPC, type :BRUNWORD and the speed at which you can get on with your word processing will be breathtaking. Further, you can check your text and print it out without even thinking about a single disc operation.

Going to the other extreme, try loading 1,000 names and addresses into Info-Script, writing a letter in BrunWord, checking the spelling, then doing a mail shot, using a 24-pin printer with downloaded fonts and enhanced high quality headings using the Headline fonts.

With all of this action taking place, the only disc operation you need worry about, is the loading of the names and addresses.

What could be more simple than that? Indeed, the ROM module, in my limited experience of its operation, carries on the extreme user friendliness of Brunning products to a very high standard.

Due to its very operation, it becomes the excellent partner for a basic machine. As the disc drive remains virtually silent for most of the time, extra memory or disc drives are pointless for the normal user.

However, that's not to say that Peter Brunning hasn't given any thought to add-ons. There will always be a requirement in some business usage for various attachments, and these requirements are more than adequately catered for in the design of the ROM module.

For example, a 256K Dk'Tronics memory can easily be added to expand the available memory for Info-Script and you can certainly make good use of a second 3", or 3.5" disc drive with the unit.

Even here, Peter has been adding a few ideas of his own, making it possible to load a full 256K file into Info-Script in just 16 seconds from a 3.5" drive. Sounds impossible, doesn't it? It isn't. All you need is the ROM, a drive and the extra memory for Info-Script.

That's not all, however. There is another feature for second drive users, but here I have to bite my tongue for the time being. Suffice it to say that second drive operation will become a true joy, and certainly puts the CPC ahead of other computers in this league.

Frustrated? You should be, but all will be revealed soon enough, as the full capability of this superb module is unveiled very soon.



Semitype: a resident font with pleasing results.

As an incredible plus to existing BrunWord users, you can even get a personalised dictionary update, when you upgrade to the ROM. This is because words saved during a spelling check are taken to normal memory, rather than ROM.

This causes no problem, as your discs contain a small file for all 'unknown' words. However, if you could get all of those words stored in the permanent dictionary, things would be far more convenient. As a result, if you have bought a BrunWord program within the last few years, the upgrade price includes the programming of your very own personal dictionary. Can't be bad.

The choice of when to update your word processor is entirely yours though, as Peter Brunning stresses, the combined price to buy now and upgrade to ROM, will be far less than the combined price of buying the ROM and updating your dictionary later.

Talking of price, what's all this lot going to cost you? That is something that Peter is keeping under his hat, for the time being. Consider the cost of a 256K memory pack and the Brunword Elite program, however, and the ROM cost will look extremely favourable. Compare it to the cost of a comparable PC program and you'll be laughing all the way to the bank.

That should give you some idea of what you'll need to shell out for this little innovation which, when all is said and done, should totally change the way you think about your CPC.

As a result of the foresight put into the design of the module, there is also more than enough room for you to add other expansion ROMs at a later date. indeed, ROM slots 4-7 have been left available for just such purposes. Add to this the warm start procedures of the module, it enables you to visit any complementary background ROM, without losing data in either BrunWord or Info-Script.

As I stated earlier, I have one of these little gems plugged into the back of my CPC right now. In fact, this article was written using that very product. As you can imagine, anything that passes through the ACU office can expect to come in for a hard time and, I can safely say that, to date, the BrunWord ROM has performed in an exemplary fashion on all fronts, producing extremely high quality material, particularly with the new in-built fonts to add to the variety of printing performance.

For the moment, the finished product may look a little ungainly but, having said that, my copy is very much a prototype module, while the finished, potted product, is designed to fit snugly on the back of your CPC, allowing for easy access, without taking up valuable desk space.

More than that, I cannot say. My lips are sealed. However, if you have a burning desire to know more about this little workhorse, why not try ringing Peter Brunning on 0255 862308.

Whether he will be prepared to shed more light on the matter, is another question indeed but, if you can drag him away from his computer screen for a moment, you'll find his comments an illuminating experience.

BACK TO BASICS

Galant Gordon dons his blue fedora to uncover the basics of data-comms on the CPC once more

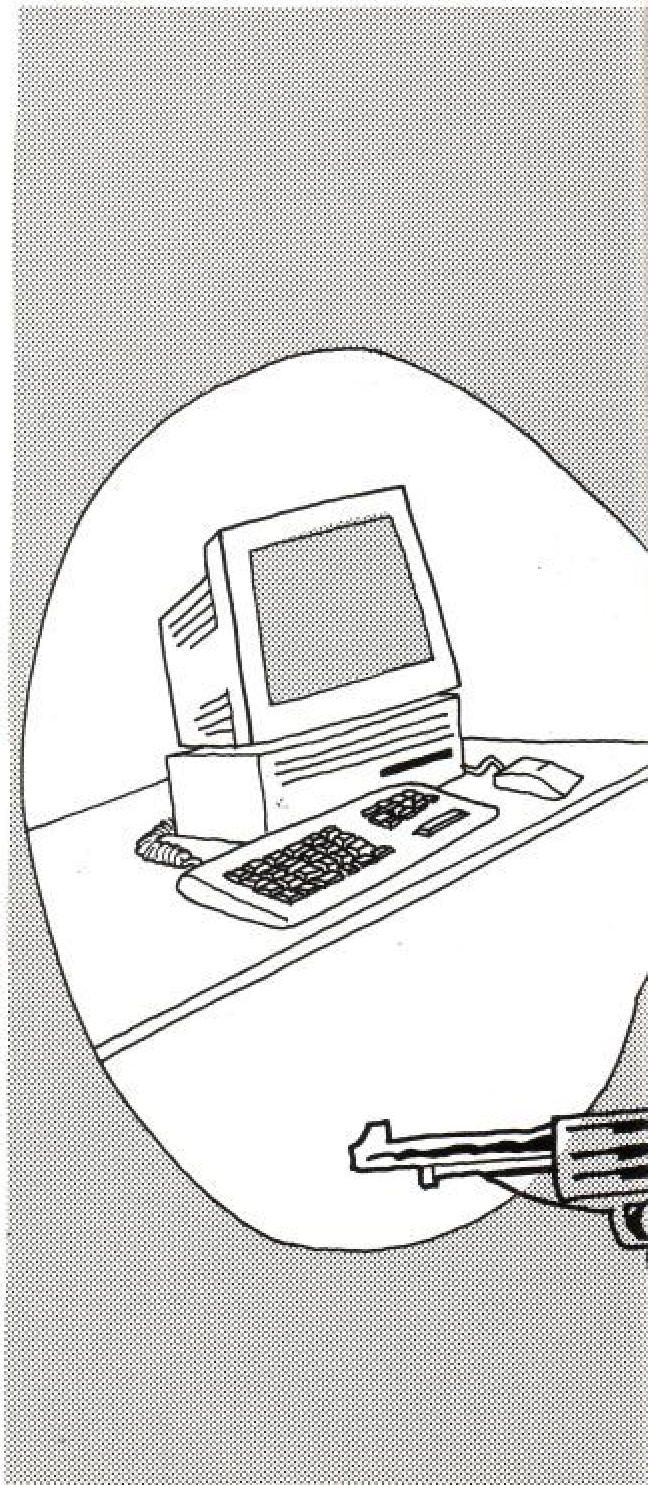
Once in a blue moon I get a phone call from our illustrious editor. Normally it's what we in the business know as a 'chaser' and con sists of the words 'You're late with your copy! Where is it?'. On other occasions, though, it's a genuine call (ie. one I don't want to ignore, rather than one I can't ignore). Well, I've had one of the latter. CK himself rang me and asked if I could run through the basics of comms one more time, since it's an absolute age since we covered the subject, and, it seems, more and more readers are buying ACU in preference to certain pale imitations thereof. They, of course, need the benefit of the definitive guide to comms on the Arnold, according to our leader, so, folks, peel your peepers and get those dialling directories ready.

This is What You Do!

Before we launch into the recipe for successful comms, let me first point something out. Contrary to what you may have read elsewhere, using a modem is not in itself a difficult task. Come to that, neither is understanding what is going on. So any notion you may have about black magic incantations over a hideously expensive black box is totally wrong, erroneous, misplaced and likewise mistaken . The Cardinal rule is 'Comms is EASY'. How easy? Well, since all you need is an interface, some software (normally comes with the interface, as it happens) a cable and a modem, plus, of course, a phone line, just how easy do you want it to be? Like any other task you perform on your computer, what you're actually doing is running a program, so it's the program you have to learn. And just like any other serious piece of software, it has to be installed – so that's where we'll start. First, the interface. It's an RS232C interface, of which there is a dwindling number of makes on the market. My all time favourite has to be the original Amstrad self-powered interface, one of which still handles all my comms needs on my trusty old 6128 (a proper grey one that doesn't show the dirt like the new ones do). That, sadly, went out of production when Pontius was still a UT Pilate (if you don't understand, ask your dad). However, there are still a few around, from the likes of Maplin, Pace (if they have any left) , Cirkit, and so forth. It fits onto your CPC just like any other interface – via the expansion port. Now, that's not a difficult thing to do – you just slide it onto the connector, once you've made sure the machine isn't powered up, of course. The next bit is to attach the modem to the set-up. If you've any sense, you'll grab hold of a Hayes compatible modem. Without going too far into it, a Hayes compatible box accepts software commands – it's an intelligent modem, rather than a dumb one (which you operate via switches and buttons on the front panel). For reasons which I won't go too far into, an intelligent modem gives you much more control over your comms sessions. Just for starters, it doesn't HAVE to have a phone connected to it, although there's nothing to stop you from so doing if that's what you want. A dumb modem, though, needs a phone in order that you can dial out. There's more, but just take my word for it. Again, there's no need to pay the earth, contrary to what you may have read in an earlier life. I happen to know that a basic Hayes standard modem that offers the two lowest speeds can be bought for around the £25 mark. That, in case you hadn't noticed, is cheaper than some games, and a modem will last longer and give you more pleasure than any number of games – and give you access to multi-user games as well(we'll talk about those another time). Back to the recipe. The modem is attached to the interface via the cable – an RS232C cable – a 'straight-through' lead should do the trick. Again, no need to worry. A good shop will sell you the right cable with your interface and modem. The only other vaguely hardware-ish bit is to get some power to the modem, and plug the thing into the telephone socket. Easy peasy.

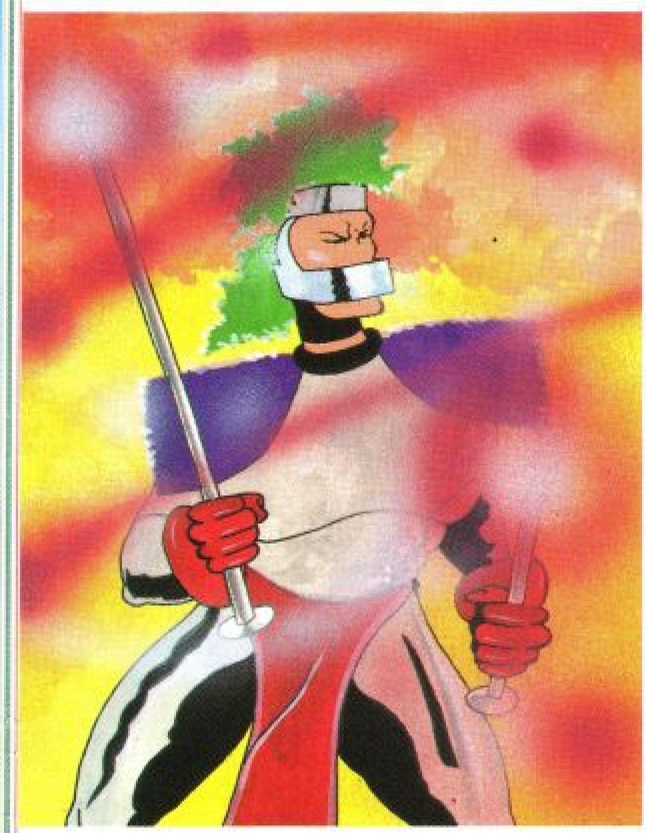
Soft Options

And so to the software. Now, this IS the ever so slightly not quite as easy as falling off a log bit. You've got a choice to make. Do you go with the software that came with your interface, or do you grab something better? Well, in order to do the latter, you may need to do the former – 'cos the better software is available on Bulletin Board Systems – our own Maxwell House being the case in point, ackshewally! For Scrolling systems (which means just about everything but Micronet and Prestel) you want a package delighting in the name ANSITERM, and a companion proggy called ZMP (for Zmodem Program). View data packages are a different ball game. The way of the world at the moment dictates that you really have to run with what you've got when you get your interface, since third-party stuff is about as common as hen's teeth at the mo. Anyroadup, as they say in the better parts of Knightsbridge, setting up your software, whatever you decide to use, is not a very difficult job at all, but there are some things you need to know. Almost all the packages need to know what speed you're talking to the modem at. This is commonly referred to as the BAUD rate. Oft times this isn't



the right word, but no matter, it will suffice for now. Assuming you've taken my advice and have a Hayes standard modem, you need to set this to the highest speed the modem will run at – either 1200 or 2400 baud (or if you're flash, 9600 baud. Anything higher is going to cause problems, so don't bother). The next bit you need to tell your program concerns Data bits, Parity and Stop bits. There are only two settings you need to know. they are 8,N,1 (for 8 data bits, No parity and 1 stop bit) which is what everything bar Prestel runs on, and 7,E,1 (for 7 data bits, Even parity, and 1 stop bit) which is what you need for Prestel. If you're not sure, use 8,N,1. If that causes problems, switch to 7,E,1. Dead easy. The only other things your software might want to know is what kind of system you're wanting to talk to, and what its phone number is. The type is simple – it's either Viewdata (Prestel/Micronet) or it isn't. If it isn't, it's Scrolling, of which there are a number of standards, but since the majority of inbuilt software in the present interfaces only allows for one type, there's little choice to make! However, when you come to use a bulletin board system, you WILL have to make a choice. Unless you're using ANSITERM, you need to make sure that the BBS knows you can't handle ANSI codes – so on Maxwell House, for instance, you'd answer (N)one to the (C)olour, (M)onochrome, or (N)one prompt when the system answers your call. We'll go into ANSI codes another time as well. As for the phone number – there's a little list of numbers at the end of this month's article – give them a try. So far, as you can see, everything you've ever read about comms being a black art is just so much hogwash. Truth be told, it's actually a very easy to get into it as a pastime, and it can be very rewarding. As a matter of interest, at the present time there are better than 300 free to use bulletin board systems in the UK, and a fair few more that you have the privilege of paying for. I won't go into my feelings on that just here – that can wait for a rant some other time as well. There are one or two caveats, though. The first is, you CAN run up some horrendously large phone bills if you aren't careful. In the first few days and weeks of comms hobbyism, be very careful to check the STD code of every call you intend to make. I fell foul of this trap when I first got into comms all those years ago, and sat messing about on a bulletin board in Eire for over an hour. That, friends, was the equivalent of breathing heavily on an 0898 number for an hour or more – £18 up the spout (more these days). So the watchword is, if you don't know where it is, don't dial it. Similarly, leave the thing alone until after six at night, unless you really want to part with large amounts of cash – remember, it's a phone call you're making, and BT don't make all that profit out of people NOT using the phone. By the same token, if you've only got a modem capable of sending at a maximum of 300 baud (common in the cheaper modems we discussed earlier) don't feel pressured into uploading files to a BBS system. On Maxwell House, we don't expect people to send loads of stuff unless they've got the gear to do it. If you haven't got faster modems, don't worry about it – use systems that don't expect you to upload stuff in order to download their free software. The majority of BBS SYSOPS (the kind folk who run the things) are very understanding about users with minimal gear, so it ought not to be a problem. Strangely enough, the converse doesn't apply – just watch the size of any files you want to suck down from a system. I may go into the money saving hints and tips again in a future column, but regular readers will already have the GB guide to saving dosh online from a while back. It's all common sense, really. Now then, before I depart for this month, a quick apology to Bob Garbutt, who is the guy running the new CPC/PCW area on Maxwell House. I didn't really mean to call you Bob Adams – I blame my Bruvver for this. He was eating a pizza when he told me about it, and I didn't check it out for myself. It's all down to those flaming Turtles. I'm sure the Doc didn't talk with his mouth full when we were kids. I'll tell our Mum, and she'll bop him one for all of you (if she can find a chair to stand on!) Sorry Bob!! And here are a couple of numbers for you to try: Maxwell House (London) – 071 828 1577- 071 490 8706 (not 12/75) Micronet Demo (London) – 071 618 1111 (Viewdata, use the ID and password 4444444444 4444) There are more numbers on both systems – have fun, and I'll see you on the systems.





Hints, tips and where to get them, straight from the Dungeon Master's Cavern

The Dungeon Master

Wow! What an exciting month this has been for new adventure releases. Anybody that believes that the adventure game on the CPC is as extinct as the dinosaur, is in for a nasty shock. If you have a low excitement threshold I suggest you find a quiet corner and strap on a crash helmet before reading these pages, because by the time you finish – your brain will be attempting to leave your head. The message from the adventure players to the large software houses seems quite plain: "If you refuse to give us the game we want to play – we'll produce them ourselves". And that is precisely what they have been doing. What follows for your delectation is a list of all the games that are currently available, apart from those that I've already mentioned in this column.

Read on and prepare to be staggered!

Wow Software, run by Joan Pancott, have been adding to their catalogue again. Joan initially set out to re-release some old games that had become difficult to get hold of but now she is also distribution some brand new titles. As these are also by new authors to the scene, this bodes well for the future. The latest titles are:–

CRYSTAL THEFT by Paul Wilson
SIMPLY MAGIC, CRISPIN CRUNCHY and TIME by M & J Trewhella.
THE TRIAL OF ARNOLD BLACKWOOD, ARNOLD GOES TO SOMEWHERE ELSE, THE WISE AND FOOL OF ARNOLD BLACKWOOD, ANGELIQUE (A BRIEF ENCOUNTER) and BRAWN FREE, all by Colin Harris.
The LOST PHIRIOUS (in three parts): THE CASSIOPIA, THE PLANETS & FALKRHANON, all by Neil Scrimgeour.
POWER CURSE by Adrian B Conn.
ESCAPE FROM PRISON PLANET by Peter Clark.

And there's more. I know that Joan has some more titles that are currently in the hands of her playtesters. True to his word, Larry has now confirmed that his games are ready and the details are:–

MAGNETIC MOON (all 3 parts) @ £5.00 and AXE OF KOLT (All 4 parts) @ £7.00, both on disc. This is £1.00 less than you will see them advertised for, so be sure to mention ACU when you send your order. Or, if you would prefer to send your own blank disc, you can have Magnetic Moon for only £3.00 and Axe of Kolt for only £5.00. As these games are written with the P.A.W. utility, tape versions are not available. You can contact Larry at F.S.F. Adventures, 40 Harvey Gardens, Charlton, London SE8 8AJ.

There's yet still more:–

Mark Eltringham of Norwich was the next person to arrange for a huge parcel to land on the dungeon doormat. (He's okay and out of hospital now). Mark has been beavering away for the past few months, trying to compile the definitive list of every Amstrad adventure ever released. This involved a great deal of research and blind alleys, often caused by the original software house no longer being in business. The authors were particularly sad about this situation, as they had a game to sell but no one to handle it. Flash! (Imagine an illuminated light bulb appearing above Mark's head). Mark has an idea! Before you could say "Recreation Re-creation" (if you can say it at all?), Mark has begun to distribute a bunch of adventure titles that, for one reason or another, have not been readily available up till now. The initial list is as follows:–

AL-STRAD and DIE, YOU VICIOUS FISH by Paul Gill.
PROJECT-X (MICROMAN) by Tim Kemp & Jon Lemmon.
CASTLE WARLOCK by Ken Bond.
DETECTIVE and CROWN JEWELS by Alex Gough.
TEALAND by Dave Lewis.
KEY TO PARADOX by Charles Sharp.

Prices range from £2 to £2.50 on tape so they are a good bargain and disc versions are also available. Further details from RECREATION RE-CREATION, 39 Gargle Hill, Thorpe St. Andrew, Norwich NR7 0XX.

Heard enough yet? Is your brain still intact or has it just remembered an urgent appointment it had to keep at Ankh-Morpork? Believe it or not, there is still more to come.

ATLAS ADVENTURE SOFTWARE of 67 Lloyd Street, Llandudno, Gwynedd LL30 2YP, have asked me to mention that they are currently selling three CPC adventures,

THE BLACK KNIGHT and ATALAN by Mandy Rodrigues.
GRUE-KNAPPED! by Bob Adams.

All three at £2.99 each on tape or send your own disc plus £2.50 each.

Have I finished yet? Nope!

Finally, in this new release roundup, not to be totally out-shone by the small independents, we actually have a new release from a major software house! Topologica have included a CPC disc version in their soon to be released adventure, SPYSNATCHER. Written by John Thackray and Jonathan Partingdon. You can write for more details to TOPOLOGICA, PO Box 39, Stilton, Peterborough PE7 3RL.

Time now to catch your breath and concentrate on all the adventures you already own but are giving you trouble.

A quick roll on the drums because here comes the…

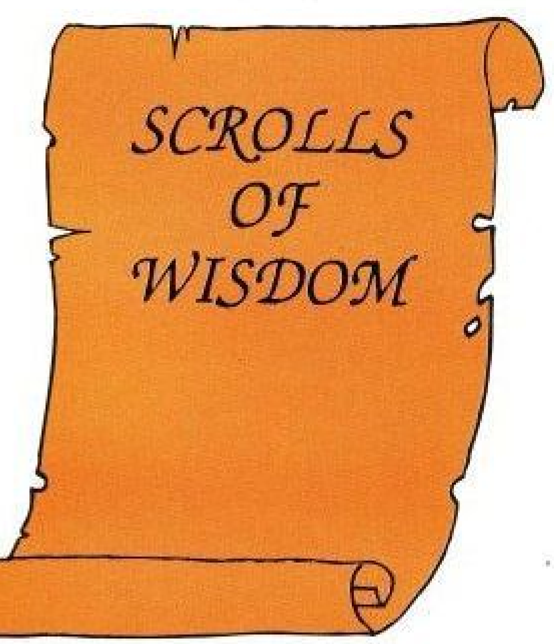
Scroll Of Wisdom.

The following good people who are experienced adventure players, have kindly offered to help any readers who are having difficulty with a particular problem. Please do not ask for full solutions and treat the "Scrollers" with due respect. Either telephone ONLY during the times shown or include a stamped S.A.E. if you write to them.

Ken Bond, author of The Test, The Base, The Island and his latest, The Spiro Legacy, is willing to offer help on any of his games. You can phone him on 0532 672278 or write to 17 Adel Park Gardens, Adel, Leeds, West Yorkshire LS16 8BN.

Joan Pancott has now supplied me with a list of her completed adventures. I think my fingers will be worn out by the end of this little lot!

Acheton, Adventure Quest, Aftershock, Angelique, Arnold Blackwood Trilogy, Atalan, Avon, Base, Black Knight, Boggit, Bored of the Rings, Brawn Free, Bugsy, Case of the mixed-up Shymer, Castle Blackstar, Castle of the Skull Lord, City for Ransom, Classic Adventure, Colour of Magic, Countdown to Doom, Crispin Crunchy, Crystal Theft, Cursed be the city, Dodgy Geezers, Dracula, Dungeon Adventure, D.A.A., Emerald Isle, Enchanter, Escape from Koshima, Espionage Island, Fantasia Diamond, Fourth Protocol, Gnome Ranger, Grue-Knapped!, Guild of Thieves, Heavy on the Magick, Helvera, Heroes of Karn, Hitchhikers Guide, Hobbit, Hollywood Hi-jinx, Hunchback, Imagination, Inca Curse, Infidel, Ingrids Back, Island, Jewels of Babylon, Jinxter, Kentilla, Kingdom of Hamil, Knight Orc, Kobyashi Naru Lancelot, Lords of Time, Lost Phirious 1 & 2, Mindshadow, Mordons Quest, Mountains of Ket, Necris Dome, Neverending Story, Not a Penny More, Nova, Panic beneath the Sea, The Pawn, Philosophers Quest, Planet of Death, Price of Magik, Project Volcano, Qor, Questrpobe 3, Return to Doom, Red Moon, Return to Eden, Rigels Revenge, Robocide, Scary Tales, Scapeghost, Seabase Delta, Seas of Blood, Simply Magic, Smashed, Smugglers Cove, Snowball, Sorcerer Souls of Darkon, Spellbreaker, Spytrek, Star Wreck, Subsunk, Sydney Affair, Terrormolinos, Top Secret, Vera Cruz, Very Big Cave Adventure, Village of Lost Souls, Warlord, Worm in Paradise & Zork 1.



If you have any clues or hints that you would just love to pass on to your fellow adventurers, or if you have a particular game that is driving you up the wall and would like to see some help printed here about it, then just write to me here at ACU and I'll take care of it for you.

ADVENTURE TIPS

Dave Havard, who seems to have a monopoly on this section at the moment – doesn't anybody else have any hints or tips to send in? – has duly supplied the following, to help us find our way in the dark, to unfathom the unfathomable and to generally demonstrate just how clever he is. Thanks Dave.

CASTLE MASTER:

To get onto the chapel roof, stand on drawbridge and throw stone at switch plate.

FANTASIA DIAMOND:
1) When you have come up from the caves, open the chest, get the glass and rub it. This gets you through the window.
2) To escape from the caves, go to the S.E. corner where there is a trapdoor in the ceiling.
3) Send Boris back across the river in the boat first. He will send it back for you if you wait.

RETURN TO EDEN:
1) Wear the foxgloves to get the cold leaf.
2) The leaf will cause the Quagmire to freeze.

WISHBRINGER:
The Poodle.
Go down from Spooky Corner to find the bone. Give the bone to the Poodle.

The Chocolate.
Once inside the Police station, wait three times. Once the officer is asleep help yourself. This is needed if you are unfortunate enough to be captured for the second time by the boot patrol. It is the component needed to wish for freedom.

The Seahorse.
Throw him back into the water. He helps to save your life later, should you be caught for a third time.

The Park.
Examine the fountain, and take the coin. You need it later to get into the theatre. In the second part, buy ticket from Miss Voss, and give the ticket to the grave digger.

The pile of Leaves.
Leave them alone in the first part. They are a trap for a smaller creature which you must free later. In the second part, break the branch from the old tree, then get it and take it to the lakeside. Put the branch into the hole, and rescue a royal.

The Troll.
Having begun the second part, to pass the troll, give him the can. Then get the can, and Squeeze it.

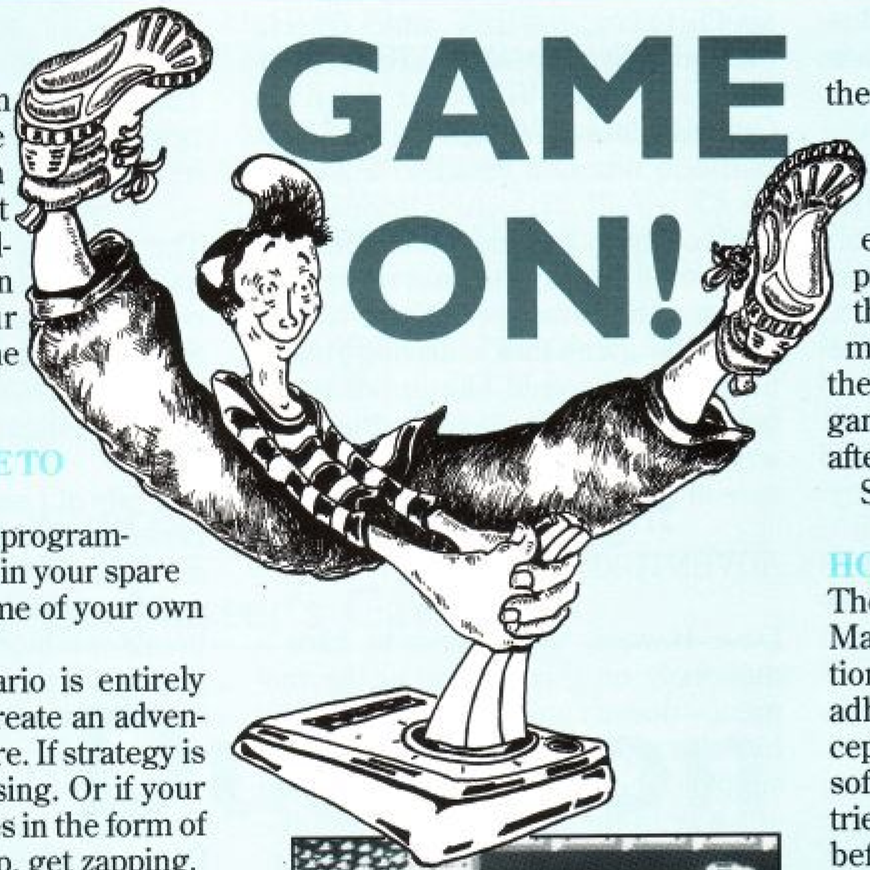
HELP ME!
Our reader in deepest distress this month, is one Trevor Bright of no fixed abode. I can only assume that because Trevor didn't put his address on the letter. Hmm? Anyway, what he would like to know is "I'm playing HERMITAGE and I don't know what to do with the pig?" Well there we have it Ladies & Gents. Do you know what Trevor should do with his pig? Here at Chez Dungeon, we'd probably turn it into roast pork before you could wink but you may know a proper solution?

And finally, do you have any old finished Infocom games gathering dust somewhere and would you like to swap them for something else? Then drop a line to the INFOCOM SWAP 'N' BUY CLUB, 167 Eastbourne Road, Lower Willingdon, Nr Eastbourne, Sussex BN20 9NB. Nic Rumsey keeps a database of people who have games to swap plus those you are searching for a particular Infocom. He should be able to put you in contact with somebody and you can then arrange your own deal. By the way, this is a free service so make sure you send at least an SSAE.

That's it, run out of room again. Happy adventuring.

Tappers, zappers and joystick-wagglers, lend me your socks and join in the mammoth ACU games creation extravaganza and win the chance to get your hands on some truly momentous prizes and a trip to the Towers. Interested? Then read on...

GAME ON!



Ok folks, button down your breeches and be prepared to take part in the competition to beat all competitions. The ultimate games creation blast, rewarding your own efforts with some staggering prizes.

WHAT DO YOU HAVE TO DO?

Simple! Just put your programming skills to good use in your spare time and produce a game of your own devising.

The choice of scenario is entirely yours. If you want to create an adventure, create an adventure. If strategy is your forte, get strategising. Or if your ultimate pleasure comes in the form of a blistering blast-'em-up, get zapping.

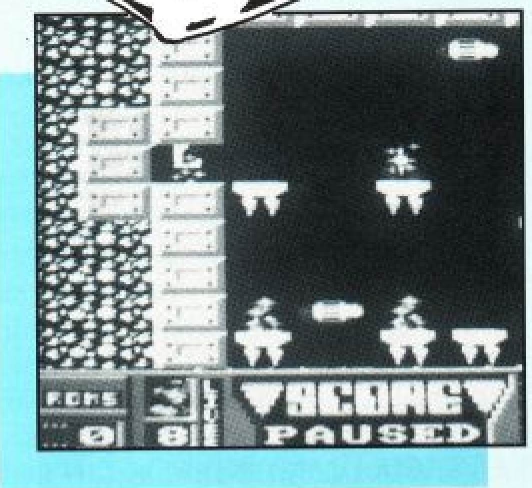
Now, before you get yourself into a tizzy, wondering where to start on this seemingly formidable task, calm down. The competition itself is set to run from now until well after Christmas, so you've got plenty of time to prepare.

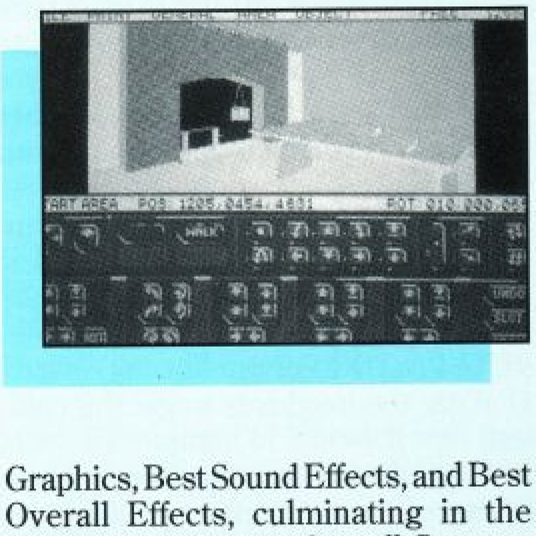
On top of that, we'll be giving you some helpful hints and tips along the way. So, if you fancy using the Sprites Alive program, the Adlan Rom, the 3D Construction Kit, or any other routine to create your masterpiece, keep your eyes on the GAME ON pages over the coming months.

Starting off next month, the renowned Oliver twins will be giving you the lowdown on the inspiration behind some of their best-selling games.

After that, you'll be treated to some handy hints and tips, as well as some superb features to help you through the sticky parts of putting a program together.

You can create your masterpiece on either disc or cassette, so the world really is your oyster.





WHAT IS IN IT FOR YOU?

Superb prizes, what else? Each entry will be judged on its own specific merits by the ACU expert panel of judges, and there will be great prizes for various categories, including Best Adventure, Best Strategy, Best Blast, Best Graphics, Best Sound Effects, and Best Overall Effects, culminating in the Grand Prize for Best Overall Game.

To give you a clue as to the excellent prizes you can expect, the Grand Prize consists of a weekend break for the family at the incredible Alton Towers theme park, including two free days at the park and first class accommodation within easy access of the amusements.

On top of that, the winners of each category will receive a specially produced ACU certificate, along with their prize, along with the prospect of making a little profit on the side, from their labours, as each of the winning games will be available for purchase after the results have been announced.

Still interested? You should be!

HOW DO I ENTER?

The rules and regulations of the ACU Mammoth Games Creation comeptition are simple, though they must be adhered to. Entries will only be accepted from private individuals, not software companies. Each of the entries must be an original creation, never before marketed or produced on a commercial basis for profit.

This stipulation is made to give newcomers to the game a relatively equal footing to those already experienced in the art of games creation.

Each of the entries should be accompanied by either a map, or solution to your offering, as well as a short synopsis of the scenario.

Once you've done all that, simply put it all together in an envelope, enclosing a stamped, self-addressed envelope, allowing us to notify you of receipt of the game, and send it off to:

ACU MGC COMPETITION
C/O THE ED
SUNNYSIDE COTTAGE
CARLUDDON
ST. AUSTELL
CORNWALL
PL26 8TY.

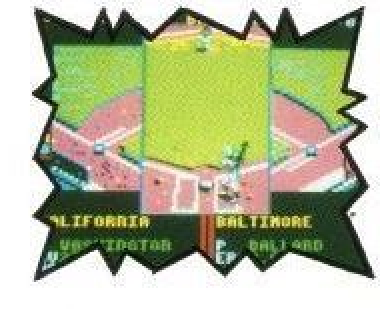
Please state on the envelope whether your game is an adventure, strategy, shoot-'em-up, or other category, to help us with the sorting, then sit back and wait for the final outcome.

Don't forget, the judges' decision has to be final. Entries will be accepted until December 31st 1991, so start planning your creation now. Good luck and read on next month as the comp starts hotting up.

Pull up your socks and concentrate as the ACU team tackles the best of Big League Baseball in RBI2, takes to the wartorn streets of LA to locate the Predator and goes back to basics to master the alphabet with Donald Duck.

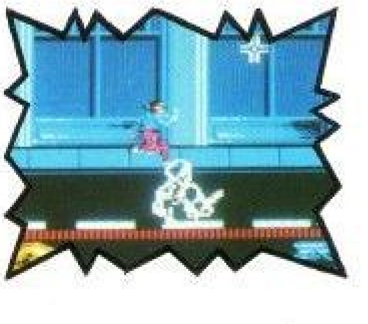
BOMB ALLEY

RBI2



A baseball simulation with a real feel for the real thing.

PREDATOR 2



Yup! The hunter's back, and it's your job to stop him in his tracks.

DONALD'S ALPHABET CHASE



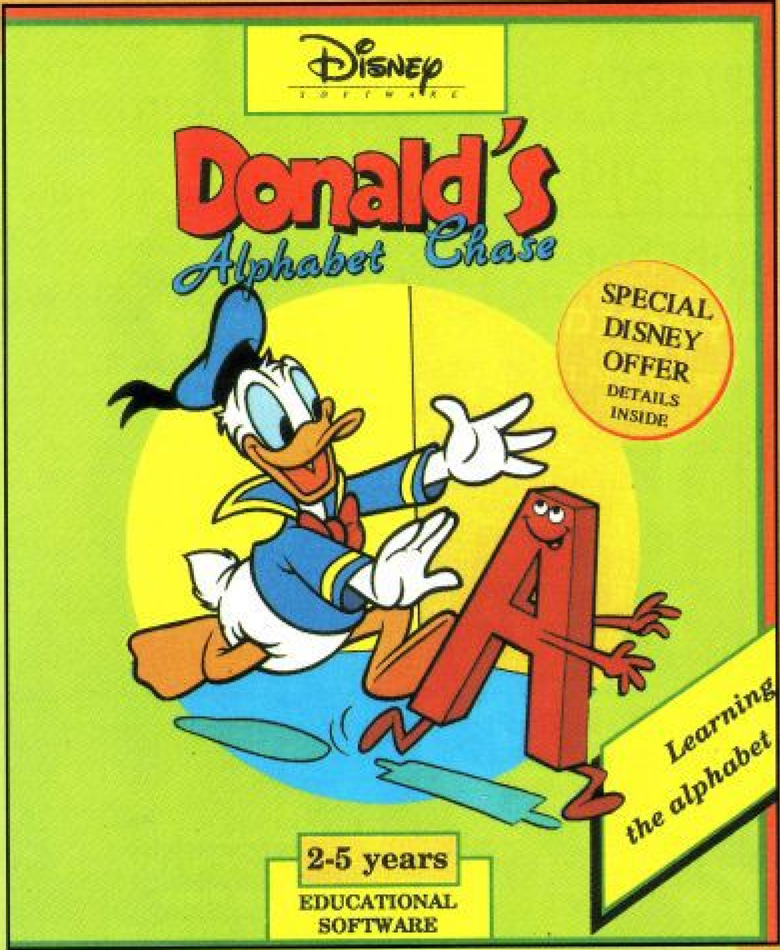
Proving that education can be fun, and in a big way.

PLUS

Footie management comes under the spotlight with two excellent offerings, alongside the epic adventure, Lone Wolf, the futuristic aqua blast, Hydra and another barnstorming collection of budget offerings to tempt your pockets. Be there!

1 (1) Magic Land Dizzy
Code Masters
2 (NE) Dragon Ninja
Hit Squad
3 (2) Double Dragon
Mastertonic
4 (NE) Multimixx 1 Golf
Kixx
5 (6) Cavemania
Atlantis
6 (7) Spitting Image
Hit Squad
7 (NE) Kick Off
Anco
8 (NE) Scooby-dooandScrappy-doo
Hitec Software
9 (3) Quattro Firepower
Code Masters
10 (5) Continental Circus
Mastertronic
11 (9) Quattro Adventure
Code Masters
12 (10) Dizzy Collection
Code Masters
13 (9) After Burner
Hit Squad
14 (4) Gary Lineker's Hot Shots
Kixx
15 (15) Quattro Racers
Code Masters
16 (16) RealGhostbusters
Hit Squad
17 (13) Operation Wolf
Hit Squad
18 (NE) Dizzy Panic
Code Masters
19 (11) Forgotten Worlds
Kixx
20 (NE) Big Box
Beau Jolly

Last month's position in brackets





DONALD'S ALPHABET CHASE

It's as easy as ABC, or is it? Find out for yourself as Donald takes charge.

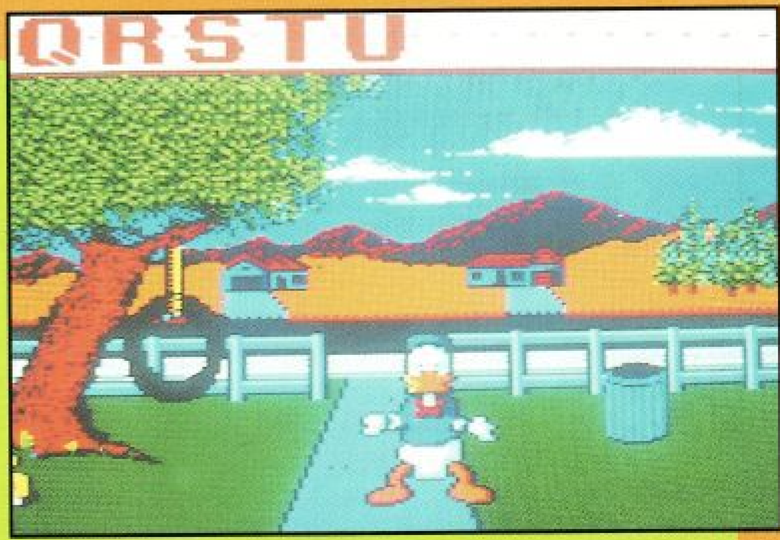
Ok, now before you all run out and buy this game, thinking it's a Disney classic to complement your shelf, this one's been designed for the very young, so seasoned gamesters may have to look elsewhere for entertainment.

If, however, you have young kiddies at home, or you know of a nipper who's just starting out on the arduous reading trail, then Donald's Alphabet Chase is an excellent educational entertainment package.

It's all about letter recognition and learning to use the keyboard and the storyline goes something like this:

Donald comes home to find his house has been invaded by happy magic animals, shaped like the letters of the alphabet.

Your part in the game, comes in the form of helping Donald to capture them again. In each room of the house, certain groups of letters can be found skulking in the scenery, for example, A, B, C, and D can be found in the kitchen, some are in the garden, some are in the bathroom and so on.



There are two ways you can play the game. While Donald is walking around, pressing any letter on the keyboard will send Donald off in search of that letter and, when he reaches the right room, the letter will be seen floating around for your child to identify.

Alternatively, when in a room, each letter will flash alternately. If your child presses the corresponding letter, Donald will immediately locate that letter, allowing your child to recognise and associate each letter with the keyboard.

Capture all of the letters in a room, and your child will be rewarded with a musical segment of the Alphabet song and, when all of the letters of the alphabet have been collected, you get the whole song as a finale.

The graphics are clear, each letter is instantly recognisable and, above all, for the 2-5 age group, Donald's Alphabet Chase is fun.

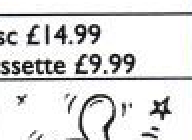
There is plenty to look at in each of the locations, and the child will enjoy searching around each room, waiting for the letter to show its face.

For learning the alphabet, recognising each letter, and teaching your child the first elements in mastering keyboard controls, Donald's Alphabet Chase will prove to be invaluable.

There's no problem about incorrect keypresses, as the program will ignore them, while the game can be interrupted at any time, to allow the more developed user to get back down to serious business, when the interest of the younger elements has waned.

All in all, a superb all-round beginning to literacy, and good, clean fun to boot. Well done, Disney Software.

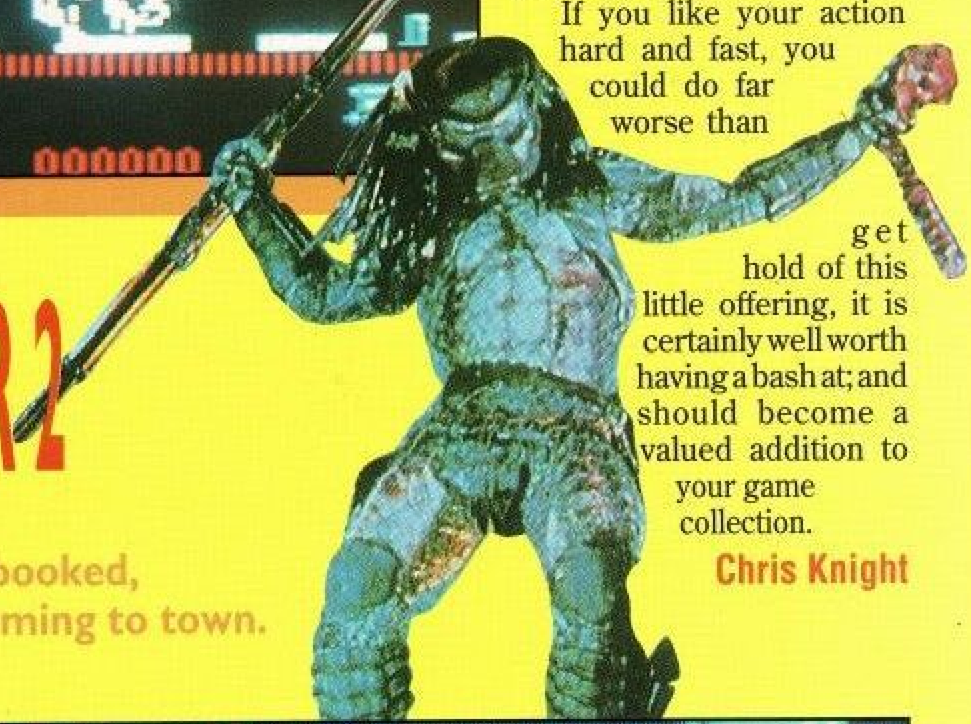
Jim Johnson

ROUND-UP			
NAME	Donald's Alphabet Chase		
FROM	Disney Software	PRICE	Disc £14.99 Cassette £9.99
82%	78%	85%	
GRAFFIX	SONIX	PLAYABILITY	VERDICT

PREDATOR 2

Get your holiday booked, the Predator is coming to town.





If you have seen the movie, then you will know just what kind of a menace you are up against here. Hitch up your ammo belt, clip in your rounds and get ready, 'cos this ain't gonna be no picnic.

As a shoot-'em-up with a difference, Predator 2 is an excellent movie licence that'll have you on the edge of your seat from the word "GO"!

Set in futuristic Los Angeles, where the streets are torn by gang warfare and the control of the drug barons, you play Detective Lieutenant Mike Harrigan, a man with a big problem.

Not only have you got your everyday punks to deal with, but now you've also got a deadly alien hunter to contend with.

Set over four extremely different levels, you're task is, firstly, to take out some drug runners on your way to their HQ. There, you have to apprehend the leader for questioning.

Then it's off to the drug lord's apartment, where some gruesome killings leave a clue to the Predator's presence.

Following some leads down into the subways, you're next objective is to track the Predator to his lair, in the abbatoir, for the final showdown.

Following closely the movie plot, you view the scenarios through Harrigan's eyes, with an on-screen cursor as your gun sights, and an image of your character in the foreground.



As you blast your way through each level, be careful not to blow away innocent bystanders. Do that, and your police shield energy will ebb away, getting you thrown off the force.

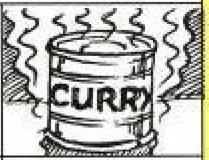
There are various power ups to be had, so keep a close eye on proceedings to ensure you don't run out of ammo. At some stages during the game, you may also notice some small triangular sightings moving around the screen. These are the predator's sights as he selects his next victim.

Be sure, at all times, to avoid direct conflict with the Predator, until you track him to his lair.

Utilising some very clever graphic effects and some neat, atmospheric music, Predator 2 is an absolute gem of a blast. There's more than enough variety to keep you hooked, while the gameplay itself is balanced enough, not too hard, not too easy, to keep you coming back for more if you happen to get written off.

If you like your action hard and fast, you could do far worse than get hold of this little offering, it is certainly well worth having a bash at; and should become a valued addition to your game collection.

Chris Knight

ROUND-UP			
NAME	Predator 2		
FROM	Image Works	PRICE	Disc £14.99 Cassette £10.99
88%	87%	89%	
GRAFFIX	SONIX	PLAYABILITY	VERDICT

MULTI-PLAYER SOCCER MANAGER

The English soccer scene gets wrapped up into one neat fixture.



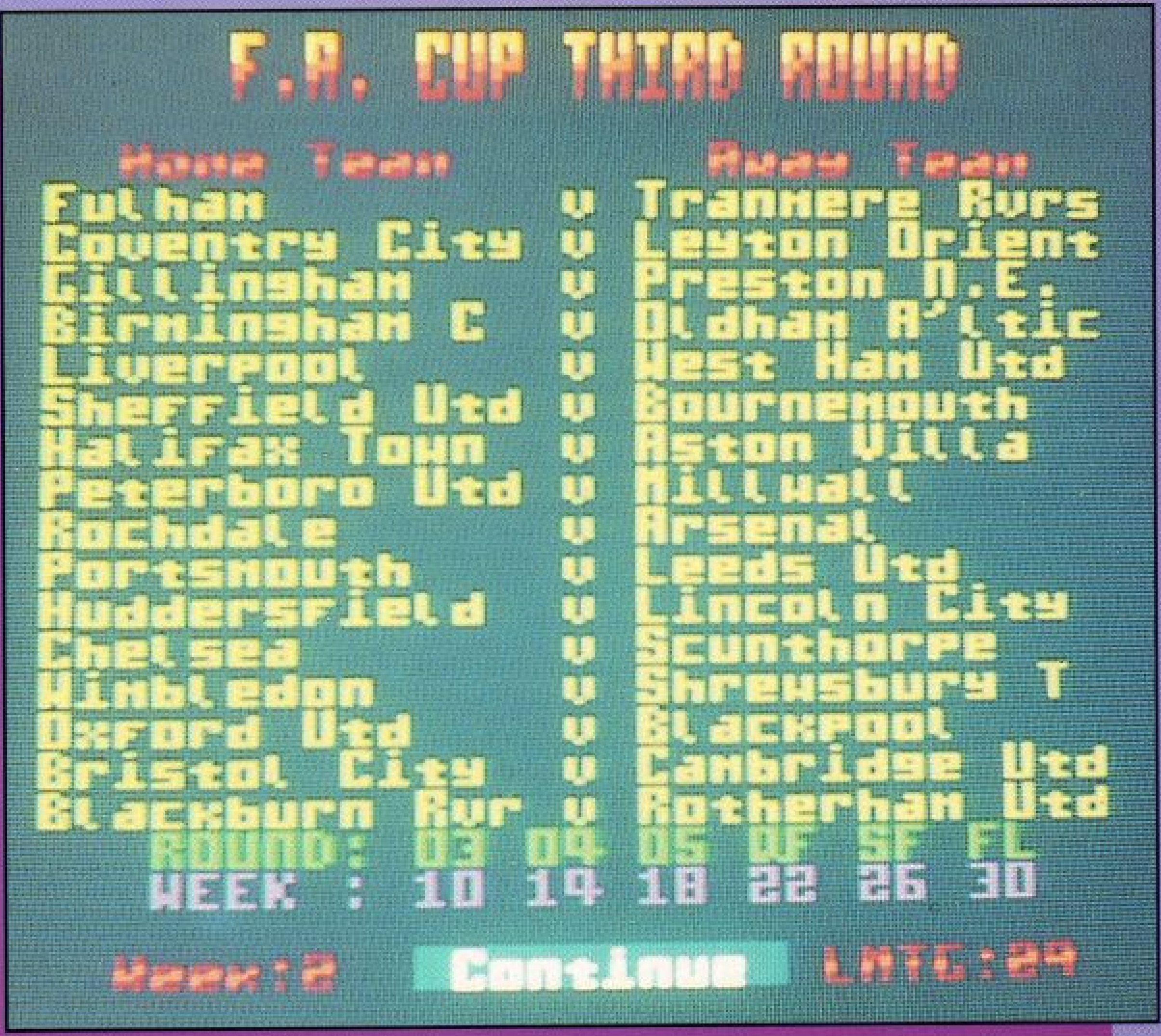
One of the big problems with many management computer games is that, naturally, they can very easily lose the human element.

Playing against a host of computer programmed opponents can get to be a little limiting in the end, despite the host of options the computer is able to choose from.

This is where Multi-Player manager comes in, giving you and up to three friends the chance to really annoy each other in your quests for soccer glory.

With 64 teams to choose from all four of the English divisions, the choice is entirely up to you.

There is, of course, a thirty week season, so it's up to you to make your moves within that period, both in the League and the Cup but, what a novelty it is to be able to start off four player-controlled teams in the fourth division, and see who comes out on top at the end of the day.



You can be sure there's going to be plenty of needle as each manager tries desperately to outbid the others for top players and tries to wheedle the other's strategy out of him before a local derby.

Naturally, there are hosts of options to choose from, as you'd expect from a strategy/management game, including training, scouting, injuries, wages, ground safety, vying for TV coverage, sackings and transfers, all of which need to be carefully balanced to gain success. However, the whole affair takes on a fresh edge when you know that your opposition is in the same boat as you are, equally capable of flashes of inspiration, or of making howling mistakes.

After all, what else are cups and leagues won or lost on?

If you think you know your friends' minds well, you'll soon find out just how much after a few rounds of strategy bashing together.

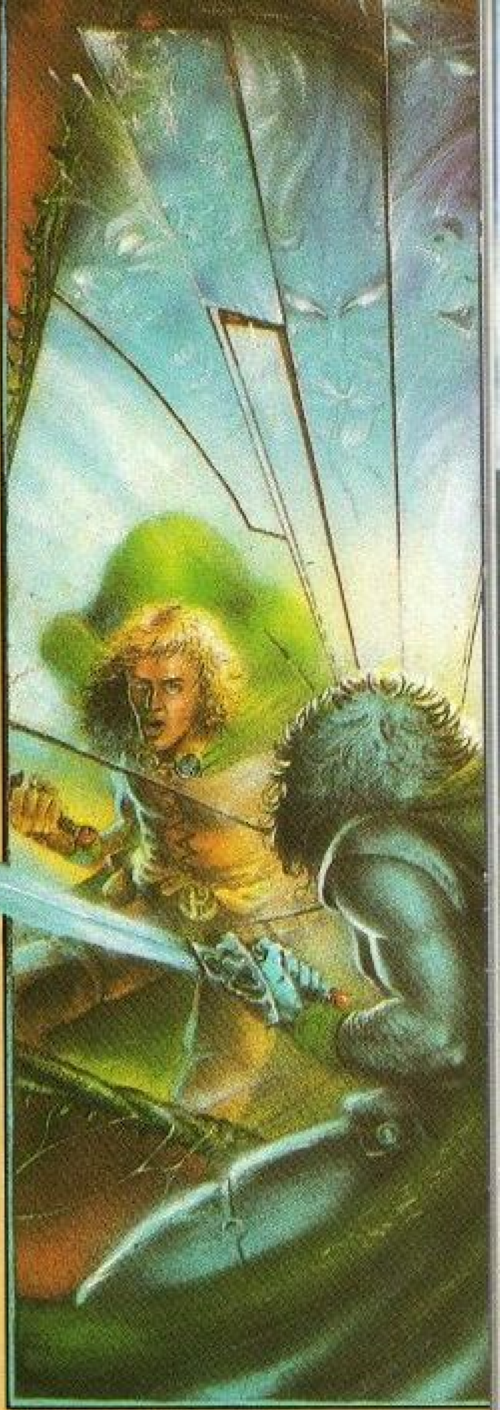
As with all of the D&H strategy games, the format has been well thought out, the graphics are clear and the easy-to-access icon controls make for smooth running of the game at all times.

The multi-player element should add an extra dimension to this excellent management offering but, just remember to make sure the opposition is looking the other way while you are making crucial management decisions, otherwise, you could find all of your hard thought out plans coming unstuck in the first few minutes of the big game.

John Taylor

	ROUND-UP		
NAME	Multi-Player Soccer Manager		
FROM	D&H Games	PRICE	Cassette £9.99
78%	N/A	79%	
GRAFFIX	SONIX	PLAYABILITY	VERDICT





LONE WOLF

Enter into the strange world of Sommerland and prepare for an epic struggle agiainst evil.



The story so far: you, Lone Wolf, are the last survivor of the great Kai Masters, destroyed by the Darklords of Helgedad.

Pledging to restore the former glory of your race, you must retrace the steps of the first of your kind, Sun Eagle, to locate the seven Lorestones, the foundations of Kai power.

In this, the first adventure in the quest for the Lorestones, your path takes you to the evil tower of Kazan-Gor. Here, trapped behind a forceshield constructed by the Elder Magi, the wicked sorceror Gorazh broods on his imprisonment, vowing that no one shall enter to reclaim the Lorestone, leaving Sommerland to the hands of the Darklords.

Guarding the tower is Dhazag-Oud, a fearsome mirror containing an evil spirit which, upon breaking, will shatter into seven demon shards to block your progress to theLorestone.

Got all that? Ok, so you've broken the mirror, and now you're on your own on a perilous quest through the evil tower. Many hazards await you, quite apart from the demons, guarding the end of each stage.

Before you start the adventure, you are entitled to pick four special powers to help you on your way. Whether you pick invisibility, sixth sense, animal affinity, or whichever of the eight choices, choose wisely, or your journey into the unknown could become even more perilous.

For instance, sixth sense will enable you unerringly to find your way through each level, depending on whether or not you survive it, that is, whilst the Mindshield can protect you from any Psi forces the demons may have at their command.

One thing to remember, each of these demons represents the darker side of yourself so, if you have a power, they are very likely to have it too. Be warned.

Lone Wolf is a splendidly thought out arcade adventure, with traps and foes aplenty, just waiting to do you in, in many nasty ways.

Your strength is represented by the four wolves' heads. Watch them carefully as your strength diminishes. Pay particular attention to the Krows. Kill them if you can, or you'll find them sapping your energy very quickly indeed.

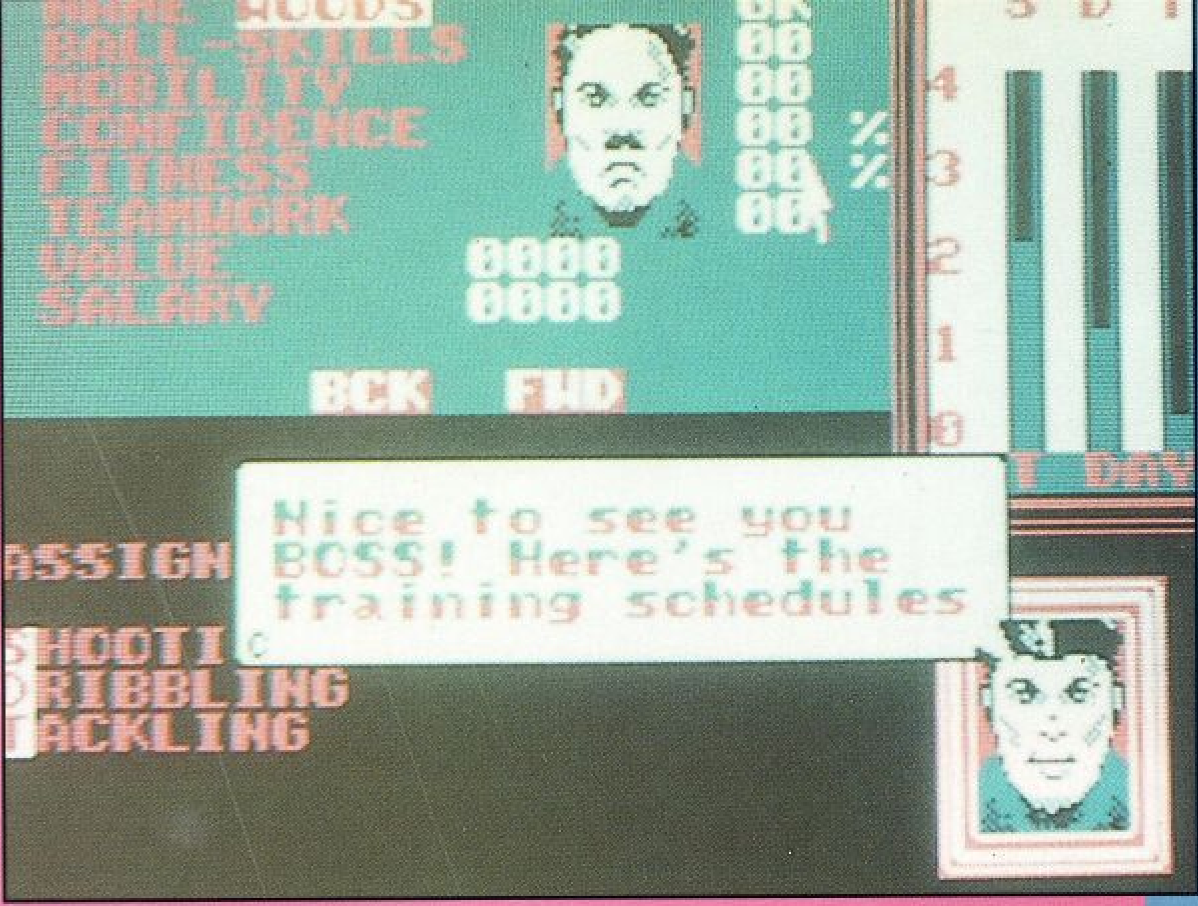
The joystick controls are easily mastered, making Lone Wolf an absolute joy to play. The corridors and dungeons of the tower may well be a little dull, but this does not detract from the excellent gameplay, which will keep you hooked at all times.

The sound effects are pretty neat and there are certainly enough choices of direction for you to take, to make the choice of sixth sense very high up on your power list.

The decision is yours, but remember, Sommerland depends on you to come through. Dare you take up the challenge? I should, it's not half bad.

John Taylor

ROUND-UP			
NAME	Lone Wolf		
FROM	Audiogenic	PRICE	Disc £14.99 Cassette £9.99
78%	85%	88%	TNT
GRAFFIX	SONIX	PLAYABILITY	VERDICT



EUROPEAN SUPERLEAGUE

The footie season may be over for the summer, but the computer action's only just starting to hot up.

If ever there were an argument for a Superleague here in Britain, you may well like to try a little experiment of the European kind to see how well your fave club might perform.

From the moment you run this little beauty, you'll be thrust right into the firing line as manager of one of the top European clubs. Choose which team you want to manage, from the likes of Liverpool, Arsenal, AC Milan and Real Madrid, introduce yourself to the Director, then get down to the hard grind in your own office.

To be fair, European Sup-per-league has been designed to give you a real taste of what it's like to be in the hot seat and, if you can't stand the heat, you know where to go.

Not only have you got the run of the mill problems, such as training, fitness, transfers and all the other pre-match preparations, but you're also going to be hit by unexpected phone calls and teasers, just when you least expected them. They're not going to go away either so, if you want to survive in your job, you've got to be one step ahead of the game at all times.

The aim of the game, of course, is to make sure that you are managing the winning team at the end of the day. This may not be the team you started out with, as managers can transfer as well, but you'll have to prove your worth if you want to succeed.

Be sure to be humble before the director, unless your team is flying, and pay attention to whatever your secretary says. Miss a meeting at your peril.

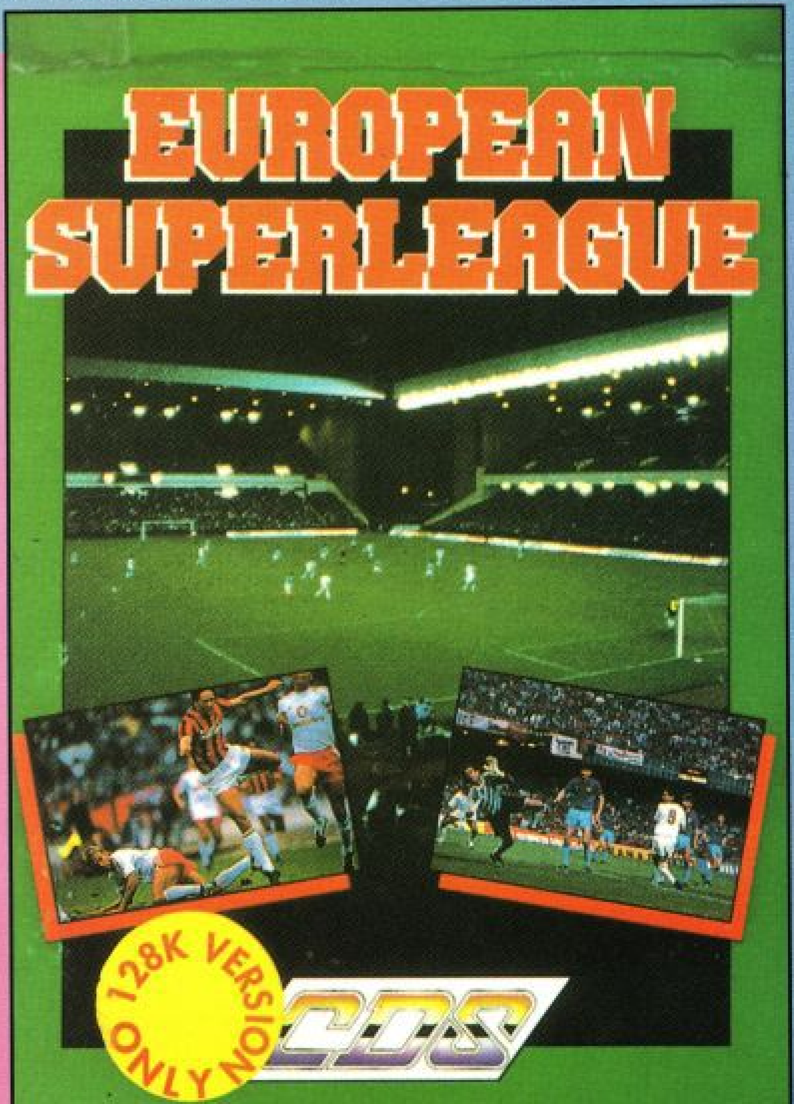
Using your own tactics, you field the team to suit your opposition's strengths and weaknesses. These can be assessed through your handy scout, who seems to know everything about everybody. Most helpful!

All in all, there are a whole host of factors that need to be sorted and balanced, to enable you to go out on a Saturday afternoon, confident of your team's appearance. Don't get complacent, though, as whatever happens, you're going to have to face the director again on monday morning to discuss the happenings of the previous week.

If you're into strategy/management games, European Superleague has an enormous amount of detail crammed into one package, with over 160 players to leaf through on the transfer stakes, and seven wily computer opponents to outwit on your way to the championship.

The graphic displays are impressive and the full icon control is a joy to use, making this one strategy game well worth shelling out your pennies for.

Jim Johnson



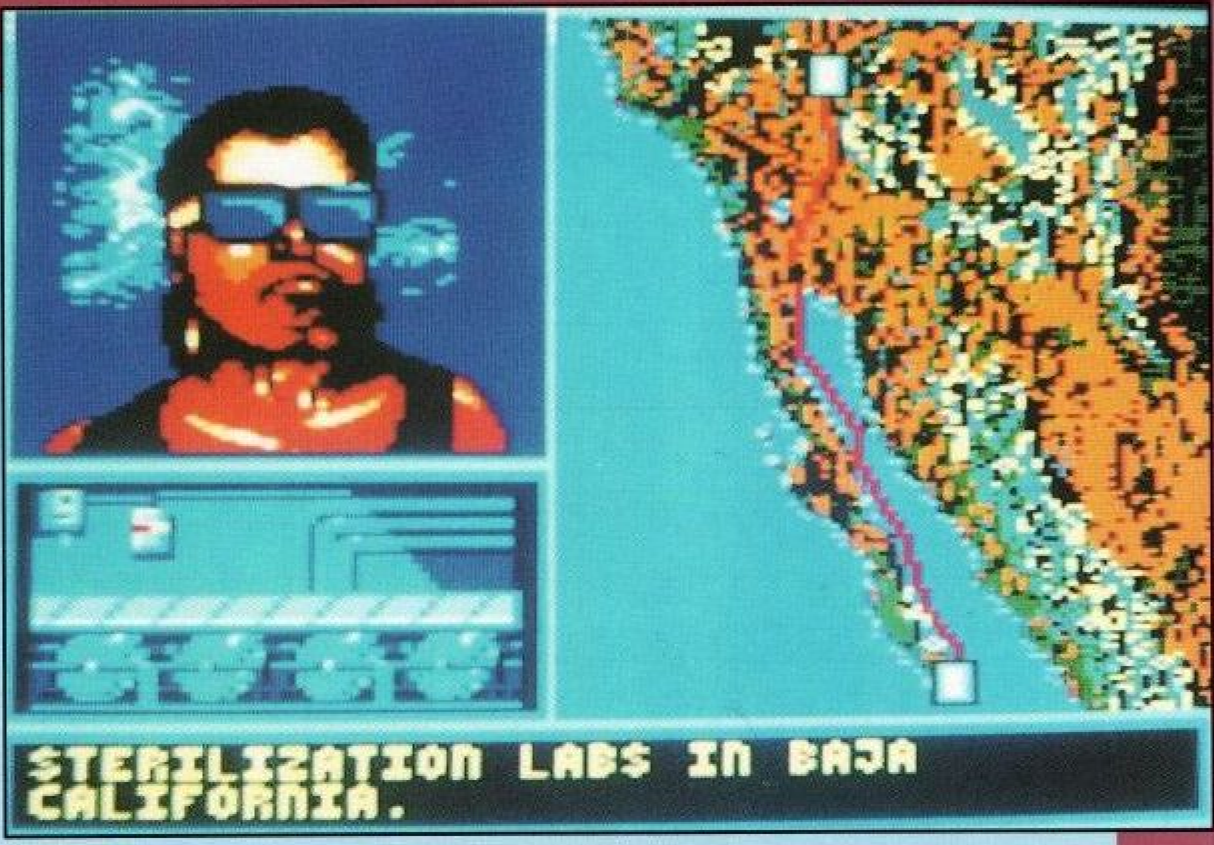
ROUND-UP

NAME	European Superleague		
FROM	CDS	PRICE	Cassette £12.99 Disc £14.99
78%	N/A	80%	
GRAFFIX	SONIX	PLAYABILITY	VERDICT

It is the future, where else, and the sky and high seas are under the control of the terrorist elements. So, what do you do when you want to get a top secret package of mutant viruses or confidential dossiers delivered? You call in Hydra, of course.

As special courier Hydra, you are in control of the turbocharged Hydracraft, capable of extremely high speeds along the waterways of the west American coast.

Indeed, so fast are these speeds, that you get the option of taking off for short bursts, through careful use of your supercharge, allowing you to see off any hostile helicopters on your case.



HYDRA



You are a courier with a difference, and not only your cargo is at stake.



What do you do when you get into your Hydracraft? You set the controls to maximum and do your best to blast the terrorists sky high, on your way to delivering your latest, sensitive cargo.

All in all, there are 31 levels to complete, each containing nine missions. As you can expect, the first few are pretty easily accomplished, but the higher you climb, the further you fall, as they say.

The race isn't against the clock, but against fuel, a very rare commodity in the future. Run out, and you won't complete the mission, so be careful to collect the crystals en route to stock up.

Avoid collision with enemies or obstacles, as you will instantly lose your vital cargo, which will be picked off by the terrorists.

Dust yourself down, get on the chase and obliterate him to regain your load. Completed your mission? Right, get to the briefing room and pick up your next cargo.

At the end of each level, you get the chance of an excellent bonus round, where plenty of money can be earned to spend in Ziggy's Weapon Shoppe. Beef up your wagon and get out onto the water for even more sizzling chase action.

Cassette owners may want to note that Hydra is a multi-load blast but, that aside, it's a corker of a game. The graphics are exceptionally clear and scrolling is smooth enough to give you a real feel for the action.

Joystick response is pretty quick, so you won't have to struggle too much getting used to the controls, while the sound effects and music won't get on your nerves too much.

All in all, Hydra is a shoot-'em-up with a difference, with plenty of variety and colour to keep you coming back for more.

If you like your action red hot, with a neat futuristic twist, give Hydra a try, it'll be well worth it.

John Taylor

ROUND-UP			
NAME	Hydra		
FROM	Domark	PRICE	Disc £14.99 Cassette £9.99
88%	78%	84%	CURRY
GRAFFIX	SONIX	PLAYABILITY	VERDICT

If you've ever had the fortune of seeing a big-league baseball game, you'll know that the tension out there on the diamond as the action gets hot can be even worse than American Football games. Especially when the home runs are few and far between and you couldn't split the opposing teams with a crow-bar.

On top of that, if you've ever tried to hit the old hard ball at high speed with the tapered bat, you'll know the skill involved in getting the big hits.

Call it luck, if you will, but baseball is all about lightning reflexes and being able to sight the ball at breakneck speeds.

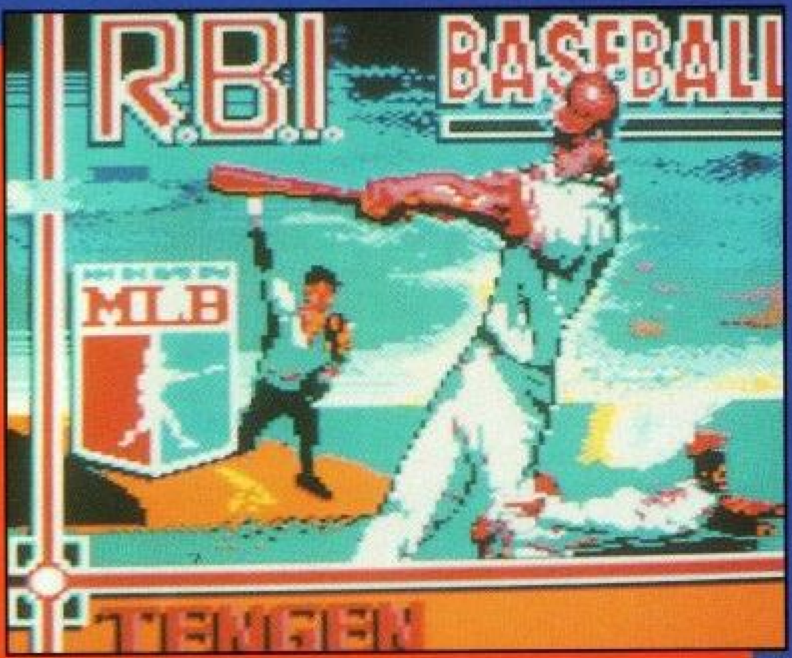
Of course, baseball is also about a little deception. As a first rate pitcher, you're going to need to hide your pitch until the last moment, leaving your opposing batter high and dry on three strikes. At the same time, the pitcher himself, has to pitch at a target, round about between the batter's chest and knees, so the batter can also do a little dancing about to try and put off the pitcher.

To be fair, trying to give you the complete lowdown of big-league baseball rules here, just wouldn't do justice to the real thing, or this superb simulation from Domark.

Suffice to say, the rules are written down in good, clean English in the manual, to give you a pretty fair idea of the ins and outs, if you don't already know them, before you switch on and start the action.

Starting off, you get a staggering choice of teams to take out for a spin, taken from all of the major conference leagues. Each team name is condensed on the option menu, so take a flick through the manual to make sure you get your favourite, be it St.Louis, Seattle or New York. If you're into baseball, you'll already know the col-





ours, so now all you have to do is make your choice of pitchers and players.

Unfortunately, because of the limited memory, the players' stats. have had to be reduced slightly, into a more streamlined format, but you've still got plenty of information to be going on with, to be able to pick your best line-up.

Using the excellent demo mode, you get the chance to watch a full game in motion, enabling you to pick up on some excellent moves to try out later on.

After that, choose to take on the computer, or a friend, and get going.

The playing field in RBI 2 is superbly displayed, with the batting box in the foreground, pitcher behind and various parts of the ground highlighted in windows at the bottom of the screen.

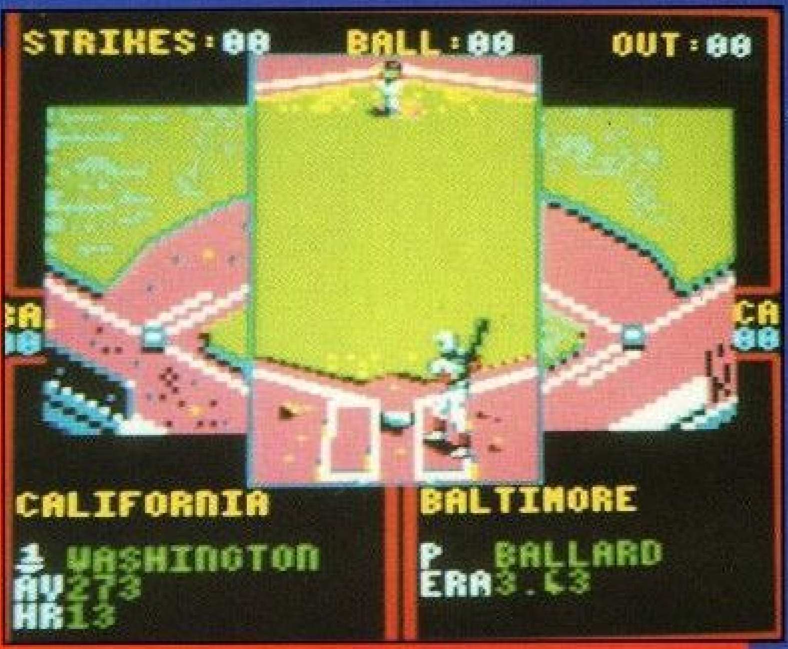
After the ball is thrown, and a hit is made, the viewpoints change, allowing you, if you are fielding, to make out your nearest fielder via the windows.

This enables you to prepare for a catch or dive, before it's too late. Once you have the ball, take a look at the running diamond window, to see how far the opposition is running, then guide the ball back to the appropriate base with the joystick.

The controls may take a little time to master, but the responses are excellent, giving you a real feel for the action.

Just like the real thing, your pitcher alters each ball thrown, to catch out the batter.

Lifting the joystick up will create a deceiving slowball, while a push to the left will curve the ball in that direction. Use each carefully, to pick out each batter's weaknesses, and you could end up with three strikes, or missed balls, and a very happy coach indeed.



As stated before, if you want to catch up on all of the intricacies of the real game, you'll have to read through the well-documented manual, otherwise you'll be left scratching your head at times, especially if you find your whole team given out, when you thought only one had been caught out.

The way this works, is that, when batting, if you happen to knock a 'fly-ball', or a sky shot, any other players you might have running at the time, must return to their original bases, or risk being given out along with the original batter.

Confused? You will be until you've seen the scenario in action. When you do, you'll be sure not to repeat it again, especially as the opposing team comes straight back into bat to rub salt into your wounds.

After watching the demo for a while, you can take on the computer over a seven game championship series, by picking a team from each of the American and National Leagues. Alternatively, pick two teams from the same



league and you can try out some league action.

In the two player mode, you also get the chance of a seven game series. For best results, give this option a trial. As the action hots up towards the final rounds, the needle should really get going, as each successive pitcher tries to be at his most devilish. Epic stuff.

RBI 2 is a stunning simulation of an excellent sport, which doesn't get the coverage it deserves over here. Ok, so it may well be just a derivation of rounders but, they have turned this game into a real spectacle of skills and spills. Getting hold of a simulation, as with all simulations, will not allow you to taste the real thing first hand, but a first rate simulation will enable you to get an incredibly good feel for its subject, and RBI 2 certainly does that.

With some excellent sound effects, RBI 2 is an original offering that provides superb entertainment and hours of fun as you try to outwit your opponents in the diamond. If you don't believe me, try it for yourself, you certainly won't be disappointed.

Jim Johnson

ROUND-UP

NAME	RBI 2		
FROM	Domark	PRICE	Disk £14.99 Cassette £9.99
89%	88%	94%	GOLD
GRAFFIX	SONIX	PLAYABILITY	VERDICT

Budget Basement

Yet another barnstorming collection of 'nice pricers' for your perusal.

It seems nowadays, that the length of time before a full priced game gets churned out onto the budget format is getting shorter and shorter.

There are various pros and cons for this trend; the most obvious one being that we punters can get our hands on top notch games at an excellent price even faster than before.

It may also be a strong contributing factor to the very firm grip that budget games have over the market, on top of the extremely strong contingent of original budget games. For example, unless you are solely a disk user, why buy a full-priced game, when you can wait a few months and get it cheaper on a budget label.

Furthermore, porting a full priced game onto a budget label is a very cost-effective way of making extra profit out of a single blast. However, there must surely come a point when the policy starts to backfire, leading to less and less full-price profit.

This may account for the declining number of companies producing games for the 8-bit market, creating a kind of vicious circle situation whereby, the fewer full-priced games purchased leads to apathy and fewer full-priced games produced.

Of course, budget games are an integral part of the CPC world, and should not be hampered in any way, though the more the full priced market is abandoned, the less choice of games we users get in the long run.

What does all this lead to? A cry to both users and publishers alike to take a long look at the full priced market, to realise that there is still a strong potential market out there which we, the users, must encourage if we want to keep the shelves well stocked with Amstrad games.

DRAGON NINJA

Lovers of oriental artistry, pay attention, as this superbly put together offering is now available on the cheap side. The mission, as before, is to battle your way through four levels of gruesome adversaries, rescue the President of the USA and fly him to safety, before the villains can do the dirty on him.



Utilising some excellent graphics and very atmospheric sound effects, you start off with the usual martial arts skills of punching, kicking and jumping.

A little mastering of the controls will also afford a very handy flying kick and a power punch, enabling you to knock down more than one enemy at a time.

As you progress, look out for the evil shuriken - throwing Ninja Assassins. There are also some pretty nifty Women Warriors and guard dogs to deal with, before you come face to face with the end of level bad guys.

These consist of a fire-breathing Fat Man, an armour clad giant and the Green and Gruesome Giant Ninja, who has a terrible habit of multiplying himself, much to your chagrin.

Each of these guardians can only be dealt with by multiple blows, so be prepared for a struggle.

To help you out a little, keep your eyes peeled for extra weapons in your path and, be sure to pick up the capsules offering extra time and energy, or you'll be hard put to complete each level in time.

All in all, a top notch conversion that'll totally hook Ninja fans, as well as lovers of a good old beat-'em-up. Well worth getting hold of on the budget label.

TOP CAT

Beverly Hills Cats is a superbly original offering, featuring all of the famous cast of the old TV series, including, of course, Officer Dibble.

The story? Well, Benny the Ball has come into some money. A lot of money in fact, when an old lady leaves him her fortune because her daughter, Amy, has gone missing.

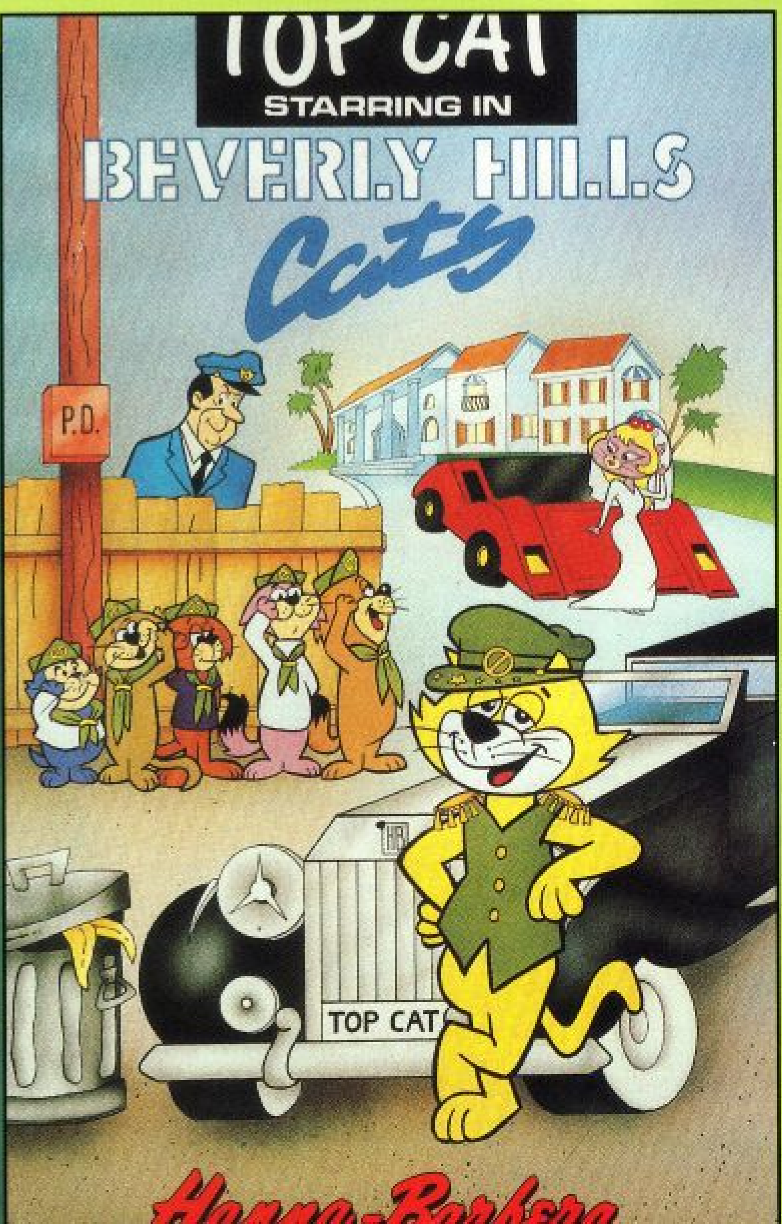
In between getting chased all over the shop by Dibble, Top Cat and the gang end up in the lap of luxury in Beverly Hills, in Madam Van Der Gelt's mansion.

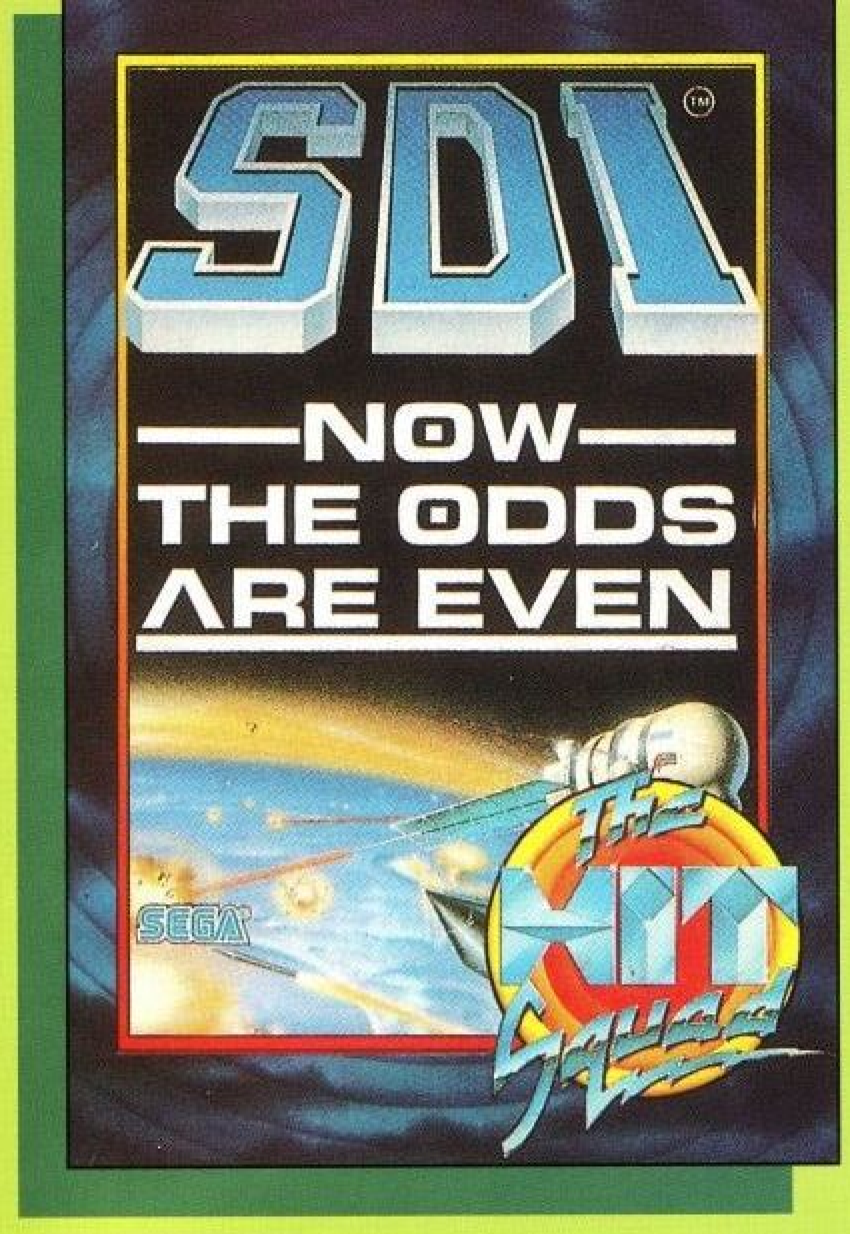
Terrific. However, big problems come in the form of Snerdly, the butler, who happens to be next in line to the fortune, if only he can get Benny out of the way.

The result of all this? Plenty of madcap capers, as the gang desperately try to live it up in style, in between assassination attempts on poor old Benny.

The only thing to be done, is the decent thing, as the gang set out in search of Amy, the rightful heiress to the fortune, in order to save Benny from an evil end.

Featuring a superb variety of backdrops, with some excellent graphics, Top Cat is





good, clean fun. Riding in the limo and playing around the pool provide just a couple of the smart locations and, as the gang get closer to the truth behind Amy's disappearance, the action certainly hots up.

The gameplay is wholly addictive and you definitely won't want to leave until the mystery is solved. With clearly defined energy and equipment windows to guide you on your hunt, Top Cat is a very cleverly thought out offering, giving excellent value for money.

SDI

For an offering with that extra edge, you'd do far worse than get hold of a copy of the marvellously crafted SDI.

Based on the true Reaganesque Strategic Defence Initiative program, this one or two player action/strategy blast puts you in total control of your country's defences. You'd better be good, or it's the end of civilisation as we know it.

In all, there are a staggering 12 different levels, each of which contains an offensive and defensive mode. Using joystick or keyboard, you are in full control of a laser loaded defence/offence satellite and, as you get to grips with the controls, watch as the first wave of an all-out nuclear war spreads from the starry horizon.

Controlling the small cursor on screen, your job is to aim your laser at the oncoming enemy and let 'em have it. Over the first level, your task is fairly achievable but, as the enemy craft and missiles begin to multiply, your life will become extremely tricky indeed.

You must keep your guard up at all times, to prevent enemy craft from penetrating your defences. Allow this to happen and you must automatically go into defence mode, as the opposing fighters, satellites and missiles bear down on you.

As you progress, the action gets red hot and you'll certainly wish you'd never started at some stages. However, to help you out just a little, watch out for the satellites bearing bonus pods. Shoot them out of the sky to release the pods, then dock with the pod to get extra cursors. Much needed in later levels.

Planning the best form of attack will take some getting used to and, after just a few plays, the tense atmosphere will make this superb game feel like the real thing.

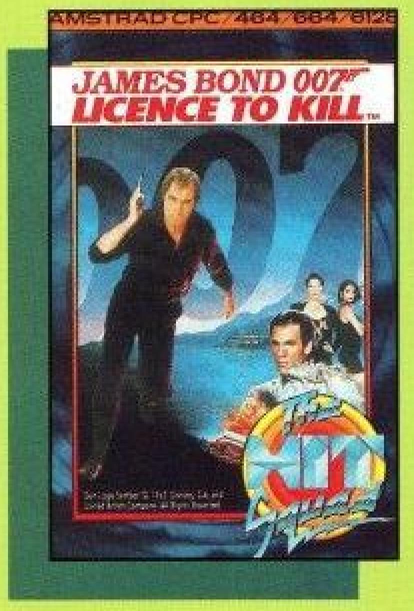
Floating around above Earth's atmosphere, the sound effects are superb, while the game itself is a true challenge for any gamester.

As a two player game, SDI is a must, with some truly marvellous graphics outlining this desperate struggle in the skies. As a budget label, SDI should hook you for hours. Try it and see for yourselves.

LICENCE TO KILL

This is it, the Bond game to beat all Bond games, and an absolute must if you like your action fast and furious.

Set over three magnificent scenes, consisting of six distinct levels in all, this is the tale of 007's revenge on the evil drug smuggler, Sanchez.



Sticking closely to the plot of the film, you, as Bond start off in the company of agent Felix Leiter, swooping down over Cray Cay by helicopter, in a dramatic bid to prevent Sanchez from escaping in his jeep with his girlfriend.

Avoiding the skyscrapers, be sure to knock out all the gun emplacements as you go blasting for the jeep.

Next up, Bond is out on his own after Sanchez. Be prepared to take on a veritable army of henchmen hiding in the background.

At all times, keep a close eye on your status panels, to check on your ammunition and time. The aim of this level, is to make it back to Leiter in the helicopter, but you'll need all of your wits about you to get there.

Getting back up into the clouds, Sanchez has made a dash for the border in his jet plane. If he makes it to Cuba, it's all over so, using Leiter's expert control of the Chopper, you must lower yourself down on a rope and attach it to the fleeing plane. Watch out for the clouds and be quick. Time is running out and this is no picnic.

Bond's next mission takes him underwater, after a drugs drop is interrupted. Armed only with a knife, you must keep the henchmen at bay until the drop plane arrives. If you manage to survive that lot, you're doing very well, indeed. Next, sling your hook and harpoon the drop plane, for some thrilling barefoot water-skiing, after you've destroyed the drug caches, of course.

Take control of the seaplane and you're onto the final mission: stopping Sanchez' convoy of trucks before they hit the border.

Take out each tanker in turn, taking care to avoid the vicious Stinger missiles, before finishing off Sanchez for good.

What can you say? Truly rip-roaring action, masterfully put together to produce nailbiting tension from the word GO! Viewing each scene from above, some of the graphics are excellent, and you certainly won't encounter a dull moment in your hunt for the bad guy.

For fast and frantic action, Licence to Kill is hard to beat and, if that's what you're after, get out and buy it now.

Dragon Ninja	Hit Squad	£2.99	78%
Top Cat	Hi-Tec	£3.99	88%
SDI	Hit Squad	£2.99	94%
Licence to Kill	Hit Squad	£2.99	90%

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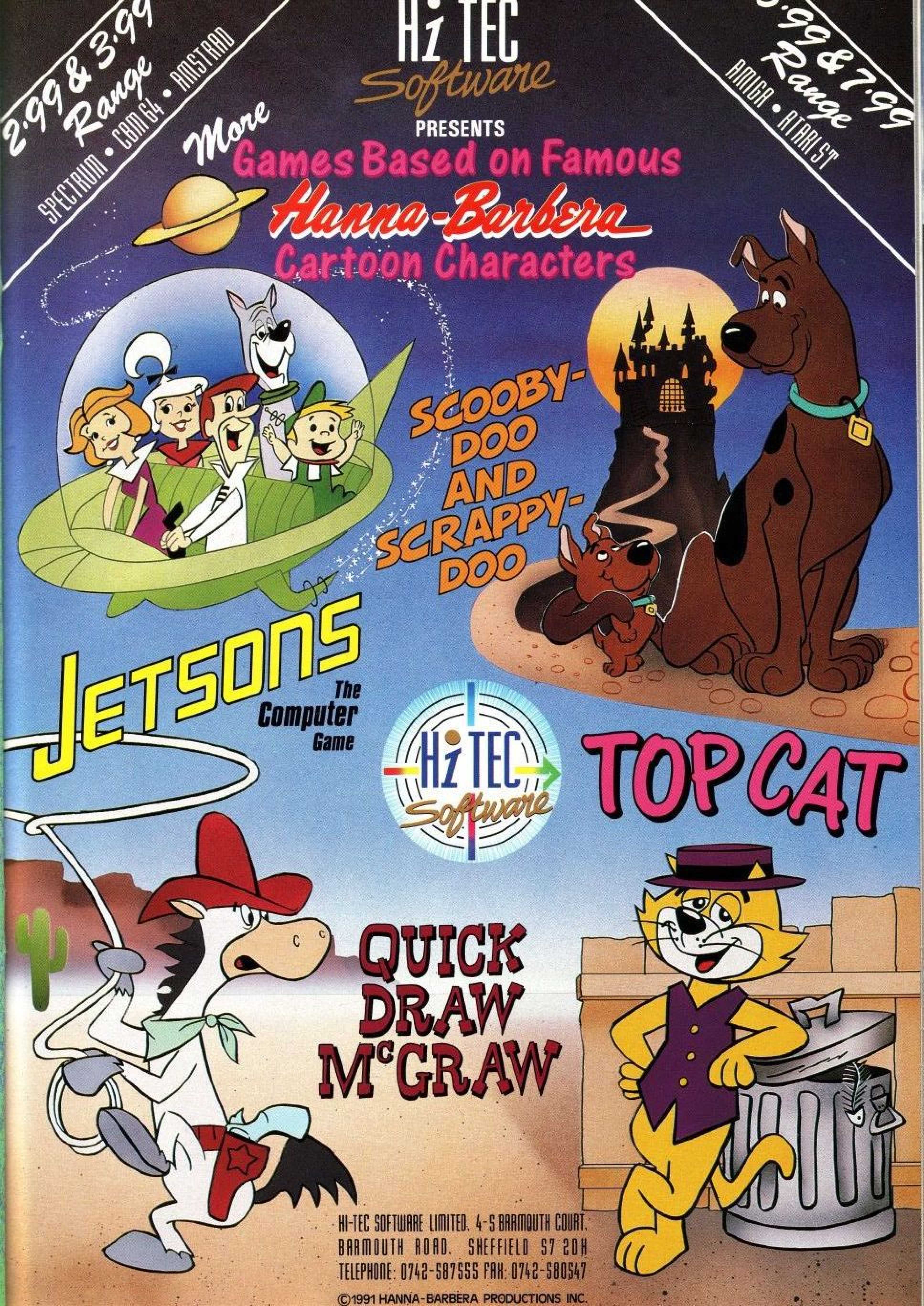
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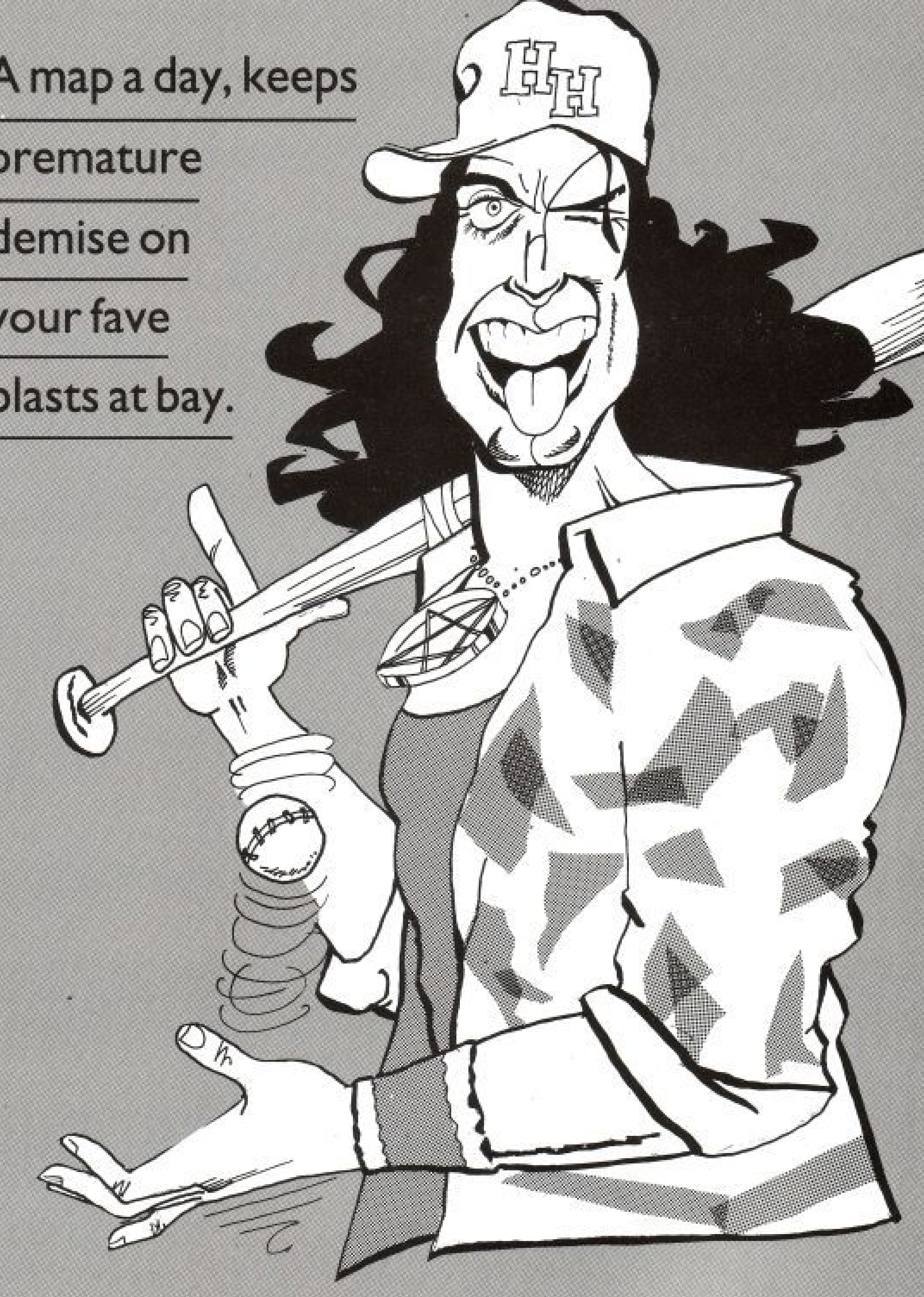
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A map a day, keeps premature demise on your fave blasts at bay.



MERCATORIALLY SPEAKING

Taking over where that well-known proverb above leaves off. Whaddya mean, you've never heard that proverb before? I've distinctly heard my Uncle Bob say it on numerous occasions, especially before launching an assault on the north face of my kitchen cupboard.

Anyway, putting all that aside, there's nothing like a little map-making to help you get the high scores, is what I say.

Any of you adventurers out there will agree wholeheartedly with that. However, even some of your more complicated blast zones could do with a little mapping, 'cos it ain't half frustrating when you've just cracked a new level on your game before getting zapped. There you are, thinking to yourself: "I'll just nip through these levels I've already beaten and get back to where I left off, with all my lives intact!"

Well, you and I both know that it doesn't always work out this way. You get through the first level ok but, just when you're beginning to get confident, whoops! Oh no! I forgot about that Goblin there!

Yep. Happens all the time, don't it? So, point proven. Maps are important and, if you hadn't thought about making one before, here are a couple to start off your collection.

The first is from Nick Hayward, (you know, he of Haircut 100 fame! No, only joking), and it tells you just about all you wanted to know about Trantor, the last Storm Trooper. The map is pretty much self-explanatory, so just peruse it for a moment, then go off to complete the blast once and for all.

The second goody is also from Nick up there in Nottinghamshire. It must be the old Robin Hood legacy that's rubbed off on him, enabling him to devote so much time to helping other poor souls stuck between levels.

Anyway, this one's for the Mad God's Catacombs in that perennial favourite Bards Tale I. In this one, the asterisks denote groups of baddies, beware! The T stands for traps, lines through walls indicate doors. 'In' denotes stairs, W=Wights, S=Skeletons and Z=Zombies, what else?

The Mad God's name is Tarjan and the review board is on Trumpet Street, next to the Inn.

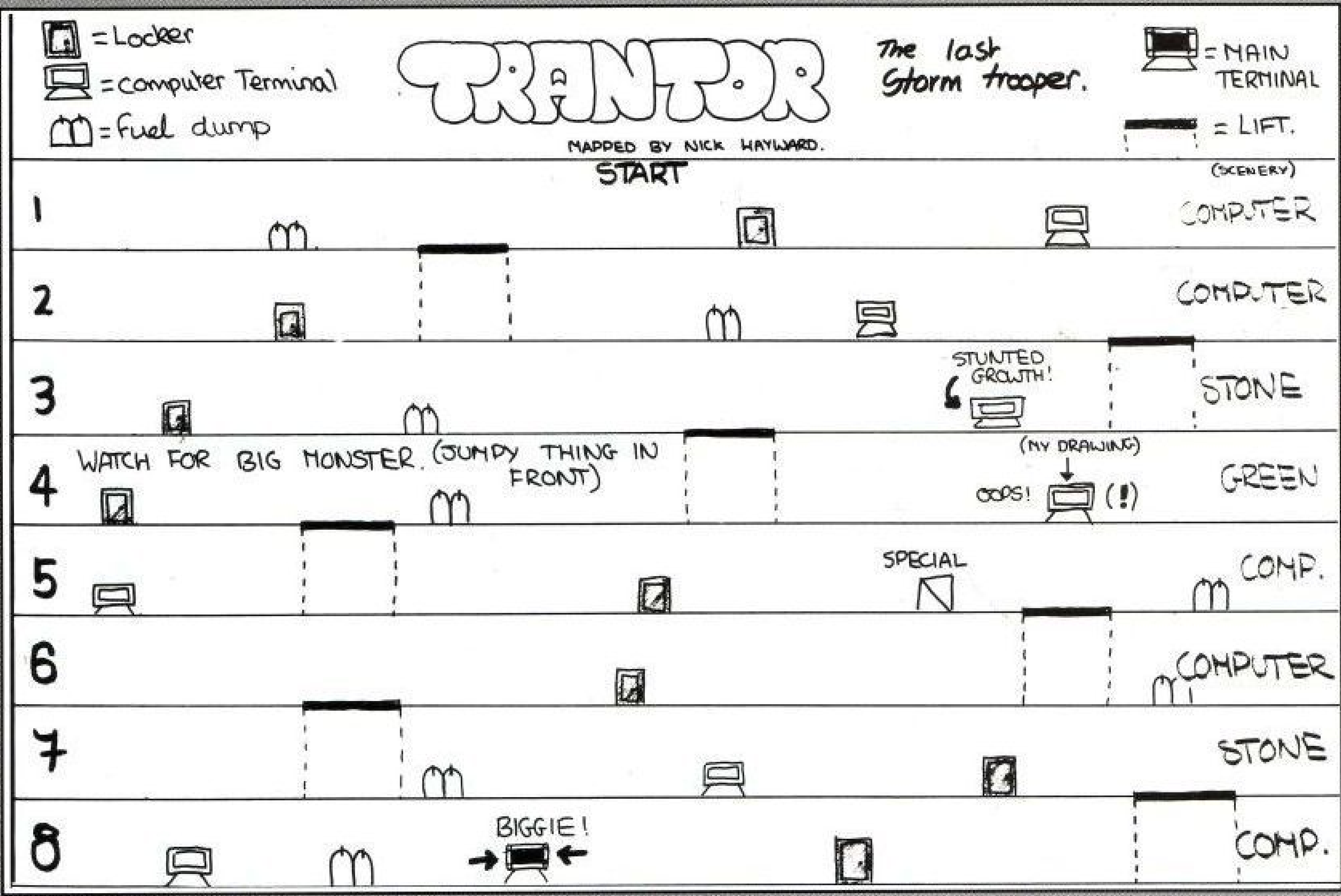
There, that about wraps that up. Next on the agenda, is the subject of Dizzy. Now, I know that there must be thousands of you out there plugging away at our little friend's adventures and, by the looks of the mail I've been receiving, most of you have been doing pretty well indeed. However, because of that, I think we're going to have to call a halt on Dizzy clues for a while, otherwise there'll be no challenge left at all. What do you lot think? I've got Dizzy tips coming out of my ears. If you want to see them, shout: "Yes!" now. Can't hear you! Seriously though, if you want more Dizzy, let me know at the usual address.

Further down the list comes some warm praise from Daniel Prest in Brentwood. Now, as you all know, I'm far too modest to mention praises. Ooer, I just did. Never mind, Daniel feels there is a distinct lack of keypress pokes so, here goes.

When typing in your name on Total Recall, try typing in INACTIVE MINDS (with 2 spaces between them). After this, you should find Arnie flashing and very, very strong indeed.

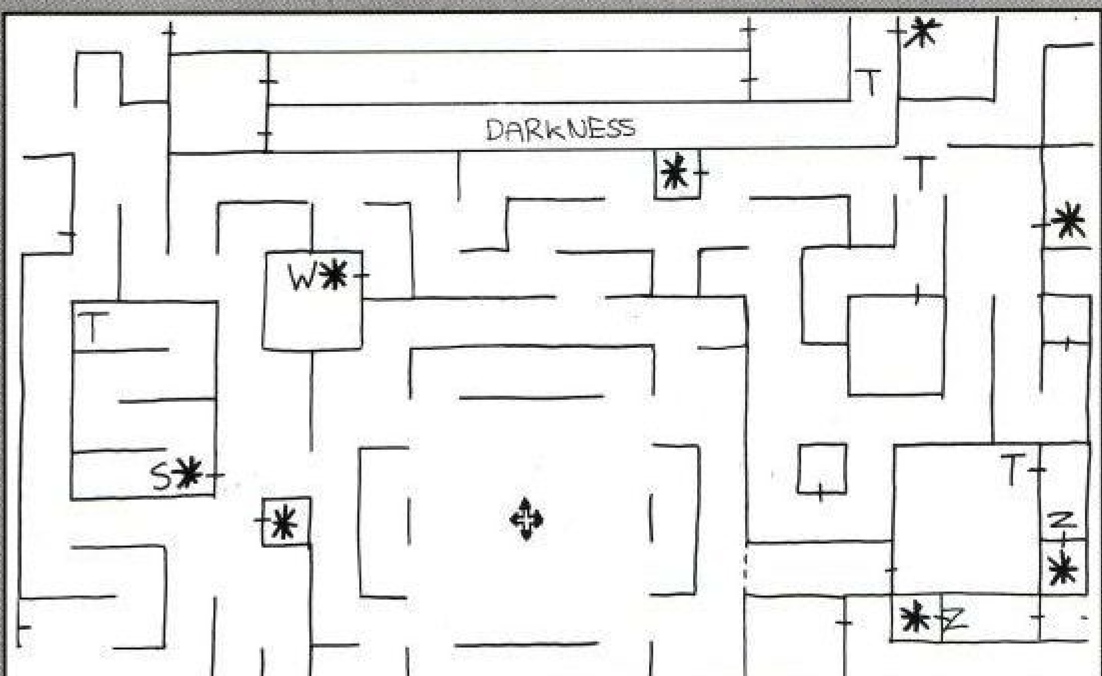
Here's a very rough and ready keypoke for, yep, Ruff and Reddy, and try to do this one gently. All you do is push down as many keys as you can at once. If the border flashes, you've got infinite lives, though this might take some practice to perfect.

According to Charles Beech of Cuffley, holding down E, M, C, I, N, D, A, R, S, G, E, T, H, Y, should get you infinite lives on Midnight Resistance. Seems like a real mullarkey to me, but he insists it works, so there. Oh yes, pressing SHIFT while you're in the cheat mode will get rid of all the on screen tanks,



planes and major enemies as well. Mr Prest has also sent in some of his own keypokes to add to the list: for Ghost Hunters, pause the game and type COMPLEX to top up your energy and press A-Z to move to different screens.

For Back to the Future 2, type in HEADBUTT slowly on the title screen to get infinite energy and, lastly, for Yogi Bear and the Greed Monster, type in STARED on the title screen for infinite energy again.



Right, that's your keypresses for this month. Now, to round off, I think we'll just have another dip into Graham Smith's seemingly endless supply of pokeykins for good measure.

On Graham's list this month is Ubisoft's Twin World, which Graham's got licked on the disc version.:

```
1'Twinworld (disc)
2' By Graham Smith
3' Infinite lives
4'
10 DATA 21, 09, 04, 22, 7c, 40, c3, 00
20 DATA 40, e5, 3e, c9, 32,5e, 34, 21
30 DATA 18, 02, 22, 7e, 34, e1, cd, de
40 DATA 00, c9,:FOR j=0 TO 25
50 READ a$:x=VAL("&"+a$) :y=y+x
60 POKE j+1024,x :NEXT j
70 IF<>2339 GOTO 120
80 PRINT"Insert game disc";
90 PRINT"then press any key
100 CALL 47896:MEMORY &3FFF
110 LOAD "twin" :MODE 1:CALL 1024
120 PRINT "data error
```

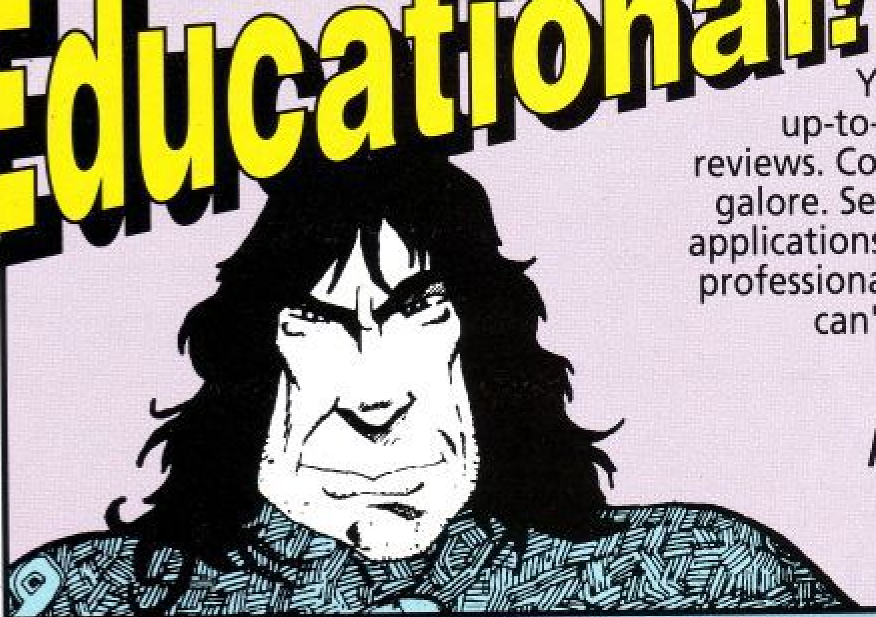
Well, that's your lot for this month, though Mr Prest did request that I keep up the little jokes at the end of the column. So, for you Daniel. Two penguins walking across an iceberg. The first penguin turns to the second penguin and says: "Say, you look like you're wearing a dinner jacket." The second penguin replies: "Maybe I am."

Curious, eh? But I blame the parents. See you next month.

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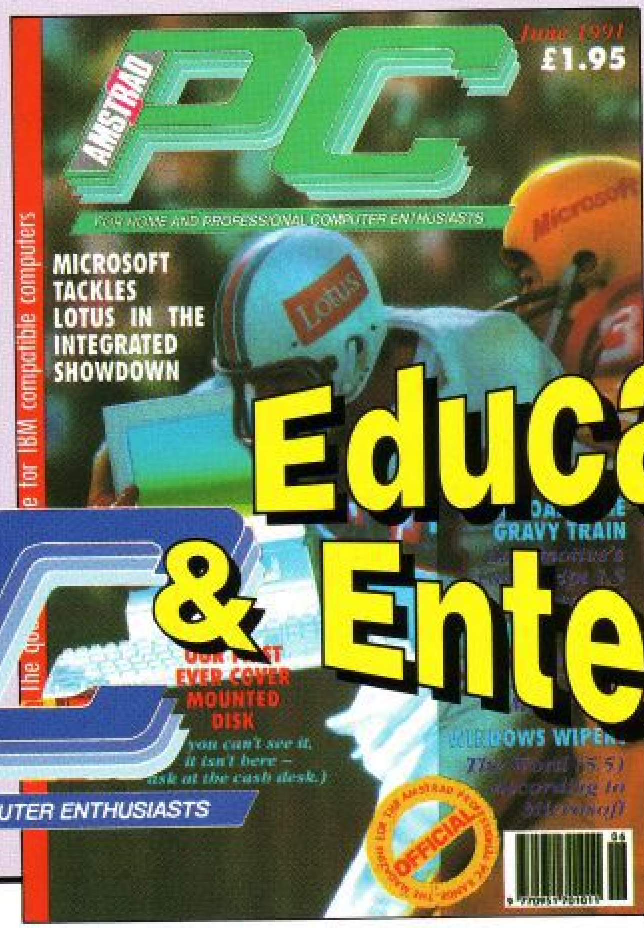
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Memory Manipulation

Glynne Davies reveals how a little PEEKing and POKEing can make life in BASIC a whole lot easier

The CPC has a RAM (Random Access Memory) of 64K (64 x 1024) Bytes. A single byte of memory can contain a number from 0 to 255. When the computer is switched on, the ROM (Read Only Memory) is copied itno the top portion of the RAM. This leaves a little over 40,000 bytes free for use by the programmer, the amount will vary, the tape version having a greater amount of free bytes than the disc version. To find out how many bytes are available

print fre("")

This command is also useful within the program when running short of RAM, it clears any unwanted parts of the memory (Garbage Collection) and makes it available for use.

PEEK and POKE

These two keywords allow the programmer to check what number is held within a certain byte or change that number. PEEK allows you to look at a memory location (byte) and POKE allows you to change the memory location.

PRINT PEEK (30000)

This command will print out the number held at byte number 30000 probably 0 or 255. This ability to find out the contents of a byte can be extremely useful to the programmer. The following program looks at the memory locations where a Basic program is stored and prints out any character within the ASCII range. When a Basic listing is held in memory, the keywords are tokenised, that is, each keyword is represented by one or two numbers, this simply saves memory space. When you Run the next program you will only see the variables and comments.

```
10 REM Program to PEEK the Listing memory
20 CLS
30 FOR look = 367 TO 1000:REM 367 is the start of the memory for Basic listings
40 number=PEEK (look): REM Set up number to contents of memory location
50 IF number >31 AND number ,127 THEN PRINT CHR$ (number);; REM If the number is within the character range display on dscreen
60 NEXT look
70 END:REM This is the end of the program
```

This program can be used to view any part of the memory and machine code programs provided you know where they start and finish. The program is a simplified version of a hacking program which would allow you to look through the code of a game searching for high scores or fixed amount of lives. Note: If you save this program, load a bigger program and then load and run this program, you will see that part of the bigger program is still in memory.

POKE 30000,27

This command places the number 27 into byte 30000. It must be used with great care, Poke the wrong number into operating system above 40000 and the program controlling the computer will change, probably causing a crash (a permanent machine code loop). It is unlikely you will cause any permanent damage but you will need to re-boot the computer. Poke is used mainly to place machine code into memory and to change certain parts of programs, once you have found where the amount of lives or high scores are within a game you can Poke a number into that memory which will give you infinite lives etc. hence game cheats.

USING PEEK and POKE

Invisible code

The Poke keyword can be used to hide your Basic code from view. With a basic program in memory Enter:–

PRINT PEEK(368)

Remember the number, it's the length of the first line

LIST

List your program to see all is well

POKE 368,0

Now list the program, the program is still in memory but invisible to LIST or RUN. To convert back to normal POKE 368 with the original number. This technique could be useful to stop prying eyes.

Make a line invisible

The first byte of the basic code is the line length, the third byte, the line number when the line number is below 256, if you change this number to 0 the line will not be shown on your listing. e.g.

POKE 370.0

If you list the program you will have the first line missing, to make it visible again POKE 370, linenumber. NOTE: You can Poke in a line number greater than the next line number. RENUM will reset the lineumbers.

New Keywords

@ If this sign is placed in front of a variable the address of the first byte where the variable is held can be found.

The next example creates a string of 40 blanks, sets pk to the start of the string's memory and then calculates where the information held within the string is located 'ad'. One byte can only hold a number from 0 to 255, therefore two bytes are necessary for numbers up to 64K bytes. The method used is two consecutive bytes, the first holding a number from 0 to 255, the second a number 0 to 255 signifying how many 256's there are, hence line 40. The program then Pokes 40 characters into the addresses where the string is held and prints out the result. This system can be very useful as temporary memory, the alternative in Basic is to use MID$ but this is a lot slower.

```
5 REM Altering the strings held in memory using POKE
10 CLS
20 ram$=STRING (40, " "): REM set ran$ to length 40
30 pk=@ram$:REM  pk=memory where the information of the string is held
40 ad=PEEK (pk+2) *256+PEEK (pk+1): REM address of start of string memory
42 a=32
```

```
45 WHILE a,255
47 a=a+1
50 FOR i=ad TO LEN (ram$)+ad
60 POKE i,a:REM any number from
32 to 255 can be used (these are ASCII
codes)
70 NEXT
80 p=(p+1) MOD 3: p=p+1:PEN p
90 PRINT ram$;
100 WEND
110 END
```

The next four programs show how certain effects not available to you in Basic can be achieved. The machine code which controls the colours is held in the operating system memory, changing a certain byte can have dramatic effects, the four programs below are for the text paper and pen and graphics paper and pen. You can use these Pokes in any program. NOTE: The addresses in the 464 and 6128 are different, the programs are for the 6128, after each Poke the address for the 464 is given, when writing for the 464 just replace the hexadecimal number.

The four programs are combined as one, this is more convenient when saving to disc or tape. You can run each program as stated in the lines preceding each program i.e. for the Vertical stripes (PEN) Enter RUN 100 as in line 95.

```
5 REM Four programs *** If using the
464 change the numbers on the POKE
lines
6 REM Change mode to reset. Also
change the ink in the pens to blend the
colours
10 REM Placing numbers into certain
areas of the memory can be put to good
use.
These pokes gives 255 mixed colours
15 REM run 20
20 REM Vertical stripes (PAPER)
30 CLS
40 FOR n=1 TO 255
50 POKE &B730, n:REM &B290 for
464
60 CLS:PRINT n;" Press any key"
70 CALL &Bb18
80 NEXT
90 END
95NREM run 100
100 REM Vertical stripes (PEN)
100 CLS
120 FOR n=1 TO 255
130 POKE &B725F, n:REM &8F for
464
140 PRINT n; "Press any key"
150 CALL &BB18
160 NEXT
170 END
175 REM run 180
180 REM Vertical stripes (GRAPHICS
PEN)
190 CLS
200 FOR n=1 TO 255
210 POKE &B6A3,n: REM &B338 for
464
220 MOVE 100, 200:DRAW 320,
300:DRAW 440, 200: DRAW 100, 200
230 LOCATE 5,20:PRINT n;"Press any
key"
240 CALL &BB18
250 NEXT
260 END
265 REM run 270
270 REM Vertical stripes (GRAPHICS
PAPER)
280 CLS
290 ORIGIN 0,0,100,500,300,100
300FOR n=1 TO 255
310 POKE &B6A4, n:REM &B339 for
464
320 CLG
330LOCATE 1,1:PRINT n; "Press any
key"
340 CALL &BB18
350 NEXT
```

Defined function

There are a number of mathematical routines available to you in Basic, i.e. SIN COS RND INT etc. If a routine such as ARCSIN does not exist then you can devise your own. A DEFined FuNction allows you to include a new keyword which will carry out some mathematical operation from a given formula.

The next program uses a defined function to calculate the length of the longest side of a right angled triangle (Hypotenuse), the function is defined on line 10, it's called FNhyp and it needs two numbers within the brackets to work. The formula for the hypotenuse is the square root of a(squared) plus b(squared).

```
5 REM DEF DN for calculating the
hypotenuse
10 DEF FNhypa (a,b)=SQR (a^2+b^2)
20 WHILE a>-1:REM To end the loop
answer -2 or below to the length prompt
and press Enter three times
20 MODE 1
30 title$="Hypotenuse Calculator":
LOCATE (40-(LEM(title$)))/2,: 1
PRINT title$
40 MOVE 450,350: DRAW 450, 200,
1:DRAW 250, 200,1:DRAW 450, 350,1
50 LOCATE 23,12: PRINT "a": LO-
CATE 28,8 PRINT "b"
60 LOCATE 19,8:PRINT CHR$ (104)+
CHR$ (11)+(121)+ CHR$(11)+ CHR$
(112)
70 LOCATE 12,16: INPUT "Enter
length a";a
80 LOCATE 12,18: INPUT "Enter
length b";b
90`LOCATE 8,20:PRINT "The hypote-
nuse is"; FNhyp (a,b)
95 PEN 2:LOCATE 9,24:PRINT "Press
any key to continue": CALL & BB18:
PEN 1
100 WEND
110 END
```

The next example plots circles or ovals

```
10 REM circle by DEF FN
30 DEF FNhp (n,x,rx)=x+(rx*SIN(n)):
REM define the horizontal position
40 DEF FNvp (n,y,ry)=y+ (ry* COS
(n)): REM define the vertical position
50 MODE 1
55 WINDOW #0,1,40,23,25: REM set
a text window at the bottom of the
screen
60 WHILE 1:REM Demonstration loop
usually the loop would need a way to
exit to exit press ESC.
70 INPUT "Enter horixontal centre";x:
CLS
71 INPUT "Enter vertical centre";
y:CLS
72 INPUT "Enter horizontal radius";
rx:CLS
73 INPUT"Enter vertical radius"; ry:
CLS
80 n=-PI:MOVE FNhp (n,x,rx), FNvp
(n,y,ry): REM Move the graphics cur-
sor
90 FOR n=-PI TO PI+0.2 STEP
0.04:REM PI=3.1428
100 DRAW FNhp (n,x,rx), FNvp
(n,y,ry), 1:REM Draw a line using pen
1
110 NEXT
115 CLS
120 WEND
```

Next month I'll be looking at how to create large characters and develop a simple game,in the meantime, here are acouple of programs that you may find useful. The first program shows how a circle is calculated using triangles and the second program is a useful utility program to find a keyword in a program, all you need to do is merge the program into the program being searched (make sure the line numbers do not clash) and add a line number 1 with the keyword to search for.RUN 2000 will give you a print out of all the lines which contain the keyword.

How a circle is calculated using trigonometry

```
10 REM Circle Demonstration
20 REM A program to show how a
circle is calculated using the horixon-
tal and vertical lengths to form a tri-
angle
30 REM Press any key to trace the
circle
40 MODE 1
50 LOCATE 8,24: PRINT "Press any
key to rotate";
```

60 REM Circles and Triangles
70 PRINT CHR$ (23) + CHR$(1): REM switch to XOR mode, if the same line is drawn twice in the same place the second line will cancel the first
80 MOVE 320, 200: REM Move the graphics cursor to the centre
90 FOR n=PI to PI STEP 0.02:REM Classic circle drawing routine using trigonometry
100 PLOT 320+204*SIN(n), 200+204*COS (n), 3:REM Plot a red dot
110 MOVE 320, 200:REM Back to centre
120 DRAWR 200*SIN(n),0,1:DRAWR 0,200*COS (n),1:DRAW 320, 200, 1: REM Draw a triangle, DRAWR means draw relative from the last point
130 CALL &BB18:REM Wait for keypress
140DRAWR 200*SIN(n),0,1:DRAWR 0,200*COS(n), 1:DRAW 320,200,1: REM Note this is identical to line 120, due to the XOR mode this erases the triangle
150 NEXT n
16 END

Keyword search program

20000nREM Line search for keywords, start program with line 1 followed by a blank then the keyword that you wish to search for. Run 20000
2000 REM make an asc file of this program i.e. save "keysearch", a load the large program and merge this program i.e. merge "keysearch"
20010 CLS:PAPER 3:LOCATE 12,10: PRINT "KEYWORD SEARCH"
20020 LOCATE 5, 14: PRINT "Printer P Screen S or Both B'
20030 PAPER 0
2240 p=0
20050 WHILE p=0
20060 IF INKEY(27)=0 THEN p= 1: REM Printer
20070 IF INKEY(60)=0 THEN p= 2: REM Screen
20080 IF INKEY(54)=0 THEN p=3: REM Screen and Printer
20090 WEND
20110 IF p=1 THEN PRINT: PRINT "Printing line numbers on printer": PRINT #7, "KEYWORD SEARCH"
20120IF p=0 THEN CLS:LOCATE 1,24: PRINT "Near beginning": LOCATE 20, 24:PEN 2:PRINT "second line on"
20130 a=368
20140 WHILE 1n<20000:REM Search up to line 20000
2015011=PEEK(a):token=PEEK(372): REM 11=linelength, token is set to the token number
20170 1n=(PEEK(a+3)*256)+PEEK (a+2): REM linenumber
20190 FOR n=a+4 TO a+11-1
20200 IF PEEK(n)=token THEN GOSUB 20240:n=a+11-1: REM If the token is found print the line number
20210 NEXT
20220 a=a+11
20230 WEND
20232 IF p=1 OR p=3 THEN PRINT #8
20224 EMD
20240 IF n>a+40 THEN PEN 2 ELSE PEN 1:REM Change colour if keyword is greater than 40 characters along the line
20260 IF p=2 OR p=3 THEN PRINT 1n;" ";; REM Only print to screen on 2 and 3
20270 IF p=2 THEN RETURN
20280 IF n>a+40 THEN PRINT #8, CHRS$ (27) (1);; ELSE PRINT #8, CHR$(27); "-"CHR$(0);; REM switch to underline (keyword over 40 characters along line) or normal (within the first 40 characters)
20290 PRING #8,1n;" ";
20300 RETURN

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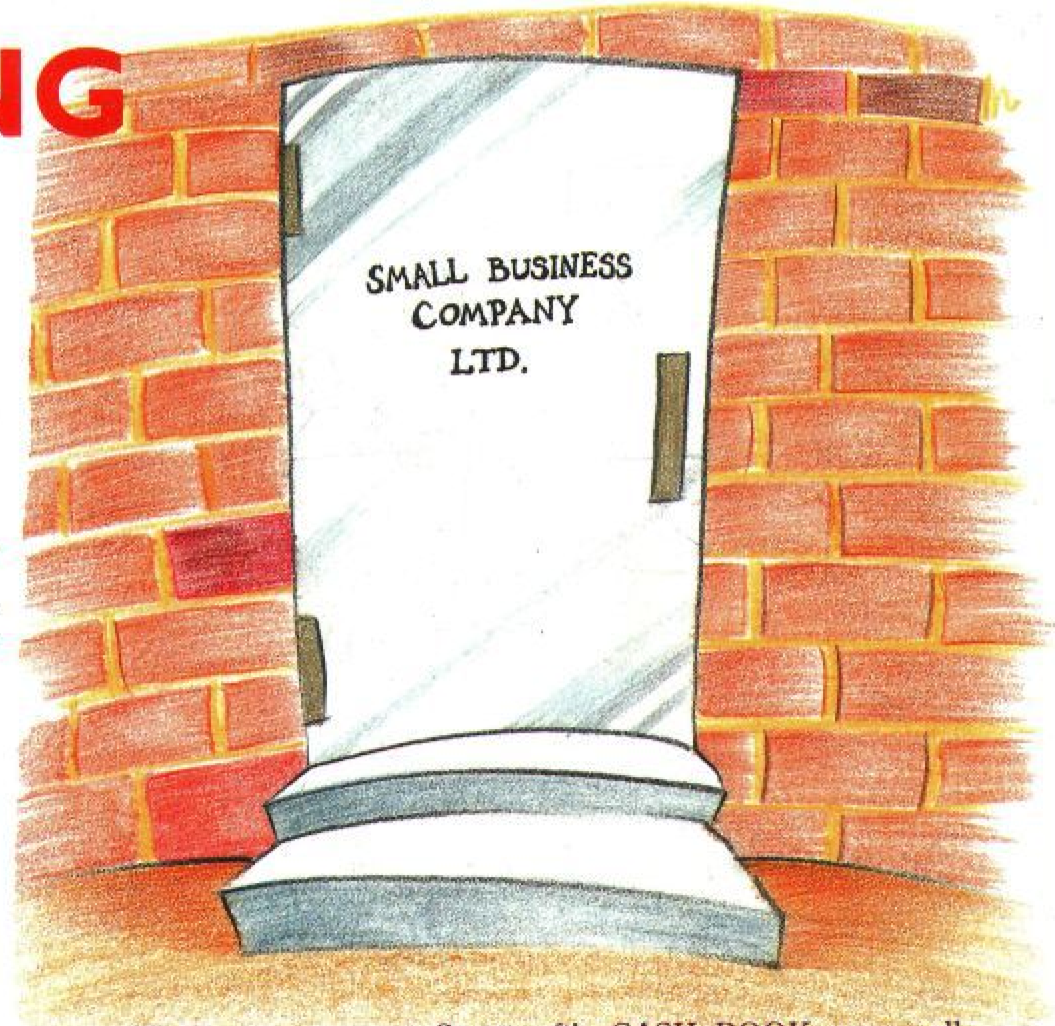
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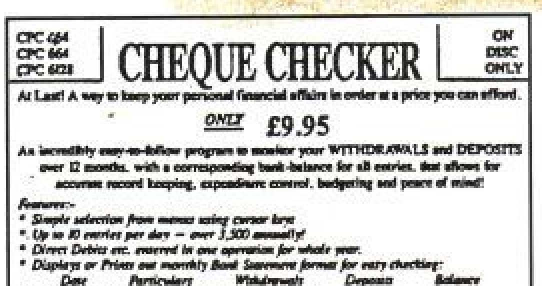
John Taylor investigates some extremely useful packages for keeping tabs on your finances.

When it comes to setting up your own small business, or just keeping a track on your own personal expenditure, a very keen eye needs to be kept on incomings and outgoings. Financial affairs can very soon become your worst nightmare.

If, like myself, you tend to keep all your receipts in your top drawer, along with the rest of the guffage you intend to look at later, you will know that good intentions very often fly out of the window, leading to a desperate scrabble at the end of the month, with the wolf, not to mention the tax collector, a regular customer at your door.

Thankfully, since the CPC came on the market there have been a number of programs specifically designed to remedy situations like this and, on the whole, these programs have been extremely competently put together. Thus allowing us grown-ups to take full advantage of a machine that might originally have been bought as a games machine for the children.

Casting an eye over some of these pieces of software should, at the least, demonstrate that, whether you run a small business, or would just like to know where you stand with your money, there is something out there to cater for your needs



Cheque Checker

In terms of use, it may be better to start off with the private customer. This leads us straight to Harrow-based GMF Programs and the extremely user-friendly CHEQUE CHECKER.

In its simplest terms, Cheque Checker is designed to take the place of those cumbersome statement books, allowing you to monitor all your financial transactions over a twelve month period.

New accounts can be opened and closed, balances can be called up in an instant, and monthly statements can be printed out in style, with the easy to use menu system.

In addition, reminders for regular outgoings can be programmed into the routine, to take care of car tax, TV licence payments and the like.

Allowing over 3,500 entries per year, Cheque Checker is a superb piece of financial wizardry at ground level.

As its makers say, the program is not intended for business use, so it is not cluttered with the complications of VAT. This contributes to the bargain price of just £9.95, making it the cheapest accounts package on the market, and, due to its ease of use, a must for those who panic at the mere sight of a printed sheet of figures arriving in the post.

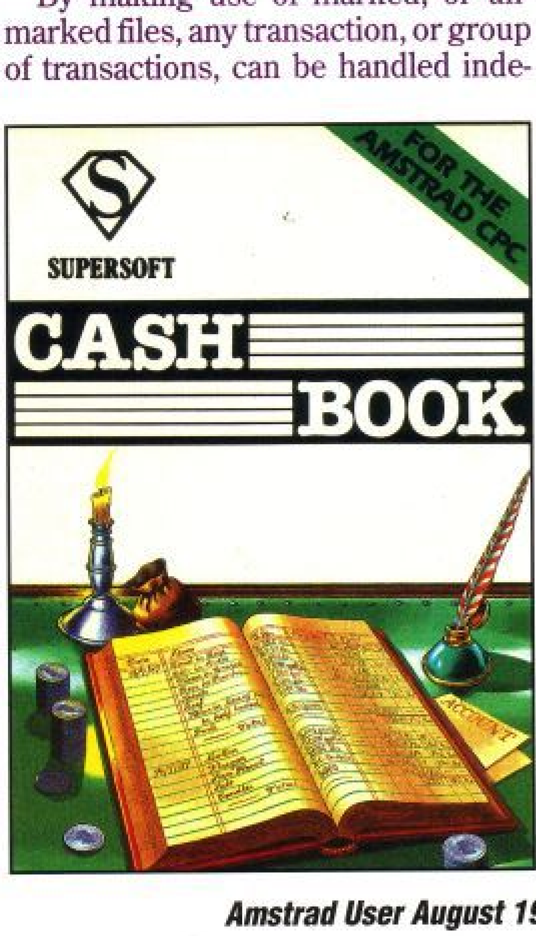
Cash Book

If, however, you feel the parameters set out within Cheque Checker might not add up to your requirements, or if you run a club, society, or even a small business that does not require too much effort in the accounts department, then Supersoft's CASH BOOK may well provide the remedy to your cashflow problems.

Again, using an easy to learn menu system, making use chiefly of the ESC key and cursors to enter and access data, Cash Book is hailed as the 'electronic equivalent of an accounts book'.

Entering and analysing transactions is the name of the game and, in truth, Cash Book is very good at it too. With the capability to handle VAT if required, or to ignore it if not, the program allows you to edit any data entered, and even to split transactions if needed for separate accounting purposes.

By making use of marked, or unmarked files, any transaction, or group of transactions, can be handled inde-



pendently, and accessed at a keypress from the main bulk of your information.

Transactions can be sorted in various ways, according to code, name, amount, VAT or date, with the option of a temporary sort, which does not affect the order of any transactions in memory, or a permanent sort, which can be used to change the order of any of your data.

Page lengths and widths can be easily adjusted to suit your printer at a keypress, while the quick key functions for accessing data will prove a real asset for the hassled user.

At a cost of £14.95 for the cassette version and £19.95 for the disc, Cash Book is a reliable piece of software at an excellent price, providing good, basic accounting for the intermediary user.

Money Manager

Moving up the scale somewhat, Connect Systems' financial management software program, MONEY MANAGER, takes into account all of your personal money dealings, whilst doubling up with ease, as a small business accounts package, it really is that flexible.

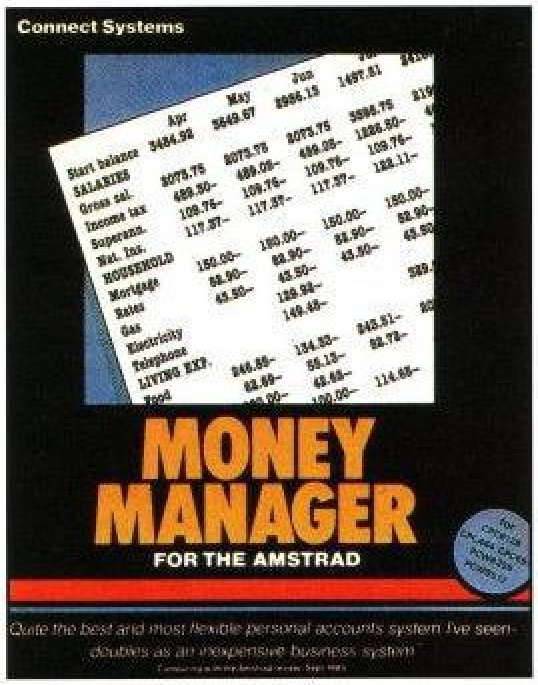
In its first guise, again, you get the option to keep a track of all of your credits and debits, with the facility to produce statements at any time, taking into account your basic salary and allowing you to calculate deductions for income tax, national insurance and even superannuation.

If you have never truly understood what happens to your gross pay, once it enters the accounts department, the simple menu operation of Money Manager will guide you skillfully to a deeper understanding of how you end up with what you get, whilst, at the same time, enabling you to make the most, through careful forward planning, with what is left.

There is a multiple accounts option, enabling you to keep a track of all your assets, which is naturally extremely valuable for the small businessman attempting to balance out different accounts to his/her benefit.

Within Money Manager, VAT can be accounted for, allowing the proprietor of any type of small business to keep a track of services and charges made.

A quick glance at the sample data statements, provided with the program, will demonstrate the full flexibility of Money Manager, ranging from personal finance accounts, through to bar charts and pie charts of business expenditure. This provides the ideal basis upon which to make all the important decisions about the future of your business.



Although extremely user-friendly, the very flexibility of Money Manager means that a full understanding of the program, before you rush in and enter reams of data, is highly recommended.

The program can be easily adapted to suit all manner of requirements, allowing you to set up accounts, class codes and reports in the manner which best meets your needs.

A good read through the manual will set you off on the right track, and it will not be too long before Money Manager becomes an invaluable tool, for both personal and business use. At a cost of just £24.95, there is an awful lot more to this program than first meets the eye and, to fully appreciate the additional features not mentioned here, your best bet is to try it for yourselves.

Extended Payroll

Moving on from the general accounting practices of personal and small business users, the next step in any company's ladder to success, is the hiring and firing of staff though, in the present climate, let us hope it is more of the former.

Getting to grips with the financial implications of employees can add an even greater burden to the small businessman's already straining reserves.

However, thanks to Hertfordshire based SD Microsystems, there is even an answer to this little problem, in the form of the EXTENDED PAYROLL.

Using an extremely simple operating routine, the program is divided into two distinct areas. The first, PAYE 1, allows you to enter exact details of each of your employees, listing National Insurance numbers, tax codes, hours worked, gross pay to date, pension contributions and so on. The list is seemingly endless, and certainly provides an excellent substitute for the old filing cabinets.

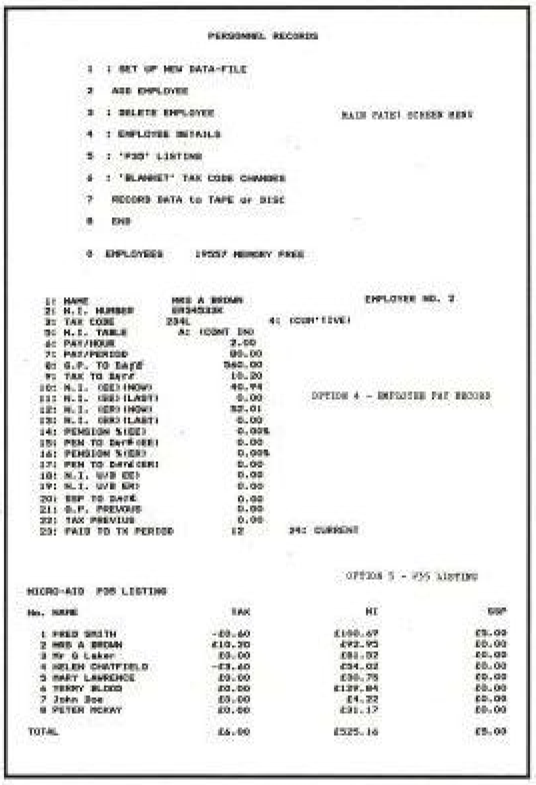
With a maximum input of 50 employees, you are not going to run out of space too quickly, either.

With P35 listings and tax code change options included, Extended Payroll forms a totally comprehensive update of your financial standing with each of your employees.

The second file area, PAYE 2, allows for the direct printing of all wage and salary slips, making all calculations of gross pay, including any overtime, sick pay, holiday or tax adjustments needed to reach a final net figure.

With options for non-contracted out and contracted out employees and full summaries of tax periods, the program does exactly what it was designed to do: take the pain out of payroll management for the small business.

At £24.99, Extended Payroll is a true good fairy, guaranteed to become an invaluable tool and well worth investing a little money in.



Faxbox

Cheque Checker
GMF Programs
Tel: 081 861 2891

Cash Book
Supersoft

Money Manager
Connect Systems
Tel: 081 743 9792

Extended Payroll
SD Microsystems
Tel: 0462 422897

LATHE

BY SIMON WATSON

Here's a simply phenomenal little program that will enable you to create your very own cross-section of shapes, from which the computer will generate a 3D wireframe image. It may not sound particularly stunning, but load it, follow the comprehensive instructions below, and you'll soon be creating veritable masterpieces good enough to adorn any Technical Drawing project. It really is quite a stunning piece of work. Try it for yourself.

(1) Edit Cross-section

The screen will display a box containing the current cross-section with a dotted line dividing the box into two halves. Editing takes place in the right-hand half, with any changes being mirrored automatically. A cross-section is a collection of points (up to 25) connected by lines.

The cross-hairs, that act as the cursor, can be moved around the box with the cursor keys. To alter the position of a point, first select it by moving the cursor over it and press SPACE. Now drag the point to its new position and press SPACE once more to release it. If you change your mind having moved a point, simply press RETURN/ENTER to return it to its previous position. Although the points are shown in a different colour to make them stand out, precisely selecting them with the cursor can still be tricky. To combat this, the word 'POINT' appears above the box whenever the cursor is exactly positioned over a point. The colour of the word changes when a point is actually selected. An alternative is to press the '.' key on the numeric pad which positions the cursor at the nearest point. NOTE: Points cannot be placed on top of other points. LINES SHOULD NOT OVERLAP!!

To create a new point move to an existing one and press COPY. The new point is now selected and should be moved to its new location before pressing SPACE. NOTE: Pressing COPY automatically releases any point you might already have selected. Therefore there is no need to press SPACE before creating a new point.

Holding down CONTROL whilst pressing DELETE will remove the point that is currently selected. NOTE: Two

continued on page 58 ▶

```
1 ' Lathe
2 ' by Simon Watson
3 ' (c)1991
4 '
10 RAD
20 GOSUB 250
30 ' --- Menu ---
40 ON ERROR GOTO 2620
50 CLS
60 PEN 1
70 LOCATE 16,3:PRINT"Main Menu"
80 LOCATE 16,4:PRINT"---------"
90 PEN 2
100 LOCATE 10,7:PRINT"(1) Edit Cross-section"
110 LOCATE 10,9:PRINT"(2) Save Cross-section"
120 LOCATE 10,11:PRINT"(3) Load Cross-section"
130 LOCATE 10,13:PRINT"(4) Create Rotation"
140 LOCATE 10,15:PRINT"(5) Save Rotation"
150 LOCATE 10,17:PRINT"(6) Exit Program"
160 PEN 3
170 LOCATE 10,24:PRINT"By Simon Watson (c)1991"
180 CALL &BB03
190 z$=UPPER$(INKEY$)
200 IF z$="" THEN 190
210 z=ASC(z$)-48
220 IF z<1 OR z>6 THEN 180
230 ON z GOTO 480,1730,1860,2030,2510,3150
240 ' --- Initialise ---
250 MODE 1
260 PAPER 0:BORDER 0
270 INK 0,0:INK 1,25:INK 2,17:INK 3,10
280 GOSUB 3040
290 WINDOW#1,15,25,25,25
300 WINDOW#2,1,40,2,22
310 PEN#1,2:PAPER 0
320 DIM a(24),b(24),x(24,39),z(24,39)
330 FOR n=0 TO 3
340 READ a(n),b(n):NEXT
350 DATA 322,52,374,152,374,248,322,348
360 point=4
370 IF PEEK(&5FE0)=&21 THEN 460
380 MEMORY &5FDF
390 RESTORE 430
400 FOR n=&5FE0 TO &5FF7
410 READ a$:POKE n,VAL("&"+a$)
420 NEXT
430 DATA 21,00,c0,11,00,60,01,00
440 DATA 40,ed,b0,c9,21,00,60,11
450 DATA 00,c0,01,00,40,ed,b0,c9
460 store=&5FE0:view=&5FEC
470 RETURN
480 ' --- Edit Cross-section ---
490 CLS
500 GOSUB 2830
510 PEN 1:LOCATE 7,24
520 PRINT"ESC:";:PEN 2:PRINT"Main Menu"
530 PEN 1:LOCATE 23,24
540 PRINT"CTRL+W:";:PEN 2:PRINT"Wipe"
550 x=438:y=200:x1=x:y1=y
560 flag=0:pflag=0:p=point
570 a=1:GOSUB 2760
580 GOSUB 2790
590 IF INKEY(0)>-1 AND y1<348 THEN y=y1+4
600 IF INKEY(2)>-1 AND y1>52 THEN y=y1-4
610 IF INKEY(8)>-1 AND x1>322 THEN x=x1-4
620 IF INKEY(1)>-1 AND x1<558 THEN x=x1+4
630 IF INKEY(66)>-1 THEN GOTO 30
640 IF flag=1 AND pflag<2 THEN PEN 1:LOCATE 18,2:PRINT"POINT":PEN 2:pflag=2
650 IF flag=1 THEN 690
660 t=TEST(x1,y1)
670 IF t<>3 AND pflag>0 THEN LOCATE 18,2:PRINT"     ":pflag=0
680 IF t=3 AND pflag<>1 THEN LOCATE 18,2:PRINT"POINT":pflag=1
690 IF x=x1 AND y=y1 THEN 790
700 IF flag<>1 THEN 730
710 a=x1:b=y1:GOSUB 2650
720 a=x:b=y:GOSUB 2650
730 GOSUB 2790
740 MOVE x,52:DRAWR 0,296,2
750 MOVE 322,y:DRAWR 236,0
760 x1=x:y1=y
770 GOTO 590
```

continued....

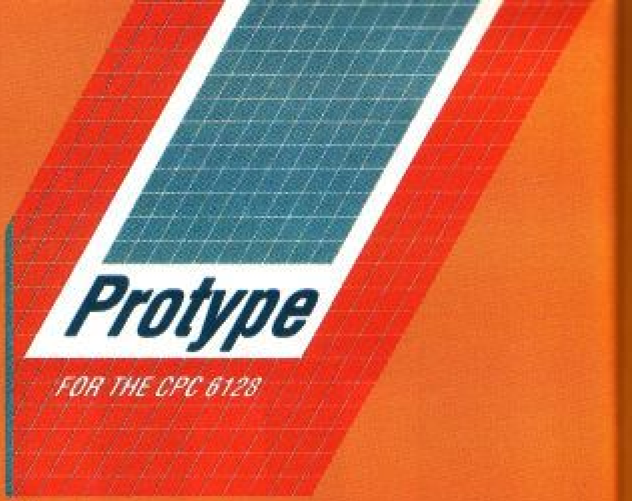
LATHE

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780 ' Create new point
790 IF INKEY(9)=-1 THEN 970
800 IF flag=1 THEN GOSUB 1100
810 IF TEST(x,y)<>3 OR point=25 THEN 1700
820 FOR n=0 TO point-1
830 IF a(n)=x AND b(n)=y THEN 850
840 NEXT
850 FOR m=point TO n+1 STEP-1
860 a(m)=a(m-1):b(m)=b(m-1)
870 NEXT
880 a(n)=x:b(n)=y
890 point=point+1
900 flag=1:p=n:q=n+2
910 a=0:GOSUB 2760
920 PLOT x,y,2
930 a=1:GOSUB 2760
940 IF INKEY(9)>-1 THEN 940
950 GOTO 590
960 ' Select point
970 IF INKEY(47)=-1 THEN 1210
980 IF flag>0 THEN GOSUB 1100:GOTO 590
990 IF TEST(x,y)<>3 THEN 1700
1000 FOR n=0 TO point-1
1010 IF a(n)=x AND b(n)=y THEN 1030
1020 NEXT
1030 flag=1:p=n-1:q=n+1
1040 ox=x:oy=y
1050 a=0:GOSUB 2760
1060 PLOT x,y,0
1070 a=1:GOSUB 2760
1080 IF INKEY(47)>-1 THEN 1080
1090 GOTO 590
1100 ' Release point
1110 IF TEST(x,y)>0 THEN SOUND 1,239,5,10:RETURN
1120 GOSUB 2700
1130 a(p+1)=x:b(p+1)=y
1140 GOSUB 2700
1150 a=0:GOSUB 2760
1160 PLOT x,y,3
1170 a=1:GOSUB 2760
1180 flag=0:ox=0:oy=0:p=point
1190 IF INKEY(47)>-1 THEN 1190
1200 RETURN
1210 ' Delete point
1220 IF INKEY(79)<>128 THEN 1360
1230 IF flag=0 OR point=2 THEN 1700
1240 a=x:b=y:GOSUB 2650
1250 GOSUB 2700
1260 IF p<0 THEN PLOT a(q),b(q):PLOT 640-a(q),b(q):GOTO 1310
1270 IF q=point THEN PLOT a(p),b(p):PLOT 640-a(p),b(
1280 MOVE a(p),b(p):DRAW a(q),b(q),1
1290 MOVE 640-a(p),b(p):DRAW 640-a(q),b(q)
1300 a(p+1)=a(q):b(p+1)=b(q)
1310 FOR n=p+1 TO point-2
1320 a(n)=a(n+1):b(n)=b(n+1)
1330 NEXT
1340 flag=0:point=point-1
1350 GOTO 590
1360 ' Return point to previous position
1370 IF INKEY(18)=-1 AND INKEY(6)=-1 THEN 1500
1380 IF flag=0 OR ox=0 THEN 1700
1390 IF ox=x AND oy=y THEN 590
1400 a=x:b=y:GOSUB 2650
1410 a(p+1)=ox:b(p+1)=oy
1420 a=ox:b=oy:GOSUB 2650
1430 GOSUB 2790
1440 a=0:GOSUB 2760
1450 PLOT ox,oy,3
1460 a=1:GOSUB 2760
1470 GOSUB 2790
1480 GOSUB 1180
1490 GOTO 590
1500 ' Wipe
1510 IF INKEY(59)<>128 THEN 1600
1520 point=2
1530 a(0)=322:b(0)=52
1540 a(1)=422:b(1)=152
1550 CLS#2
1560 GOSUB 2910
1570 GOSUB 2830
1580 GOTO 560
```

LATHE

```
1590 ' Move to nearest point
1600 IF INKEY(7)=-1 THEN 590
1610 IF TEST(x,y)=3 THEN 590
1620 dt=1000:nt=0
1630 FOR n=0 TO point-1
1640 IF n=p+1 THEN 1670
1650 d=SQR((a(n)-x)^2+(b(n)-y)^2)
1660 IF d<dt THEN dt=d:nt=n
1670 NEXT
1680 x=a(nt):y=b(nt)
1690 GOTO 590
1700 ' Rejection
1710 SOUND 1,239,3,10
1720 GOTO 590
1730 ' --- Save Cross-section ---
1740 CLS
1750 GOSUB 2840
1760 GOSUB 2970
1770 IF f$="" THEN 30
1780 f$="!"+f$+".csx"
1790 OPENOUT f$
1800 WRITE#9,point
1810 FOR n=0 TO point-1
1820 WRITE#9,a(n),b(n)
1830 NEXT
1840 CLOSEOUT
1850 GOTO 30
1860 ' --- Load Cross-section ---
1870 CLS
1880 GOSUB 2840
1890 GOSUB 2970
1900 IF f$="" THEN 30
1910 f$="!"+f$+".csx"
1920 PEN 2:LOCATE 1,12
1930 OPENIN f$
1940 INPUT#9,p
1950 FOR n=0 TO p-1
1960 INPUT#9,a(n),b(n)
1970 NEXT
1980 CLOSEIN
1990 CLS#2:point=p
2000 GOSUB 2840
2010 FOR n=1 TO 1000:NEXT
2020 GOTO 30
2030 ' --- Create Rotation ---
2040 CLS
2050 PEN 1:LOCATE 5,10
2060 PRINT "Number of faces (4-40) : ";
2070 PEN 2
2080 INPUT f:f=INT(f)
2090 IF f=0 THEN 30
2100 IF f<4 OR f>40 THEN 2040
2110 CLS
2120 LOCATE 14,10:PRINT"Please Wait..."
2130 sn=SIN(2*PI/f):cs=COS(2*PI/f)
2140 FOR m=0 TO point-1
2150 x(m,0)=(a(m)-320)/1.7
2160 z(m,0)=0
2170 NEXT
2180 FOR n=1 TO f-1
2190 FOR m=0 TO point-1
2200 x(m,n)=x(m,n-1)*cs-z(m,n-1)*sn
2210 z(m,n)=z(m,n-1)*cs+x(m,n-1)*sn
2220 NEXT:NEXT
2230 CLS
2240 a=0:GOSUB 2760
2250 FOR n=0 TO f-2
2260 FOR m=0 TO point-2
2270 PLOT 312+x(m,n),90+b(m)/1.7-0.5*z(m,n),2
2280 xc=x(m,n+1)-x(m,n)
2290 yc=0.5*z(m,n)-0.5*z(m,n+1)
2300 DRAWR xc,yc
2310 xc=x(m+1,n+1)-x(m,n+1)
2320 yc=b(m+1)/1.7-0.5*z(m+1,n+1)-b(m)/1.7+0.5*z(m,n+1)
2330 DRAWR xc,yc
2340 NEXT:NEXT
2350 FOR m=0 TO point-2
2360 MOVE 312+x(m,f-1),90+b(m)/1.7-0.5*z(m,f-1)
2370 xc=x(m,0)-x(m,f-1)
2380 yc=0.5*z(m,f-1)-0.5*z(m,0)
```

FEATURE



GRAVES AND GUILLEMETS

Printing with that specialist touch from Arnor. Jim Johnson investigates the new Protype print enhancer.

It's been a fair old while since we saw anything for the CPC from Peterborough-based Arnor and, for a time there, it looked like the word processing field had lost a strong competitor for good.

However, before some of you could decide to switch off that valued piece of software, Protext, due to lack of continued support, Arnor has kicked back into the market with something which, even at a first glance, is much more than just a half-hearted effort to rekindle interest in the 8-bit market.

Several years in the making, Arnor's new "print enhancer", Protype, bears all the signs of tender nurturing, a result of which being that, for all those specialists it has been designed for, it will prove to be an absolute godsend.

Created as a typesetting program for making the most out of either 9 or 24-pin printers, there is much more to this package than the seven resident fonts, which may catch your eye to start with.

Ranging from the medium italic cursive of the Lucca.636 font, to the bold upright sans serif of the SkyboLd.646, there is certainly enough variety of print to make any newsletter or manual look decorative.

However, and this is where the specialist angle comes in, each of these fonts are capable of utilising Protype's extensive library of non-standard characters, symbols and diacritics.

Now, to the layman, diacritics are the accents and symbols placed over letters to alter their pronunciation. Just think back to your schooldays and remember the French Graves and the German Umlauts, and you'll know what we're on about.

Fig 1: The Magnificent Seven. Protype's resident fonts.

KlassiK	.626	Medium upright serif
Lucca	.636	Medium italic cursive
Mikron	.427	Small medium upright serif
skyLite	.606	Light upright sanserif
skyKite	.626	Medium upright sanserif
skyMite	.407	Small light upright sanserif
skyboLd	.646	Bold upright sanserif

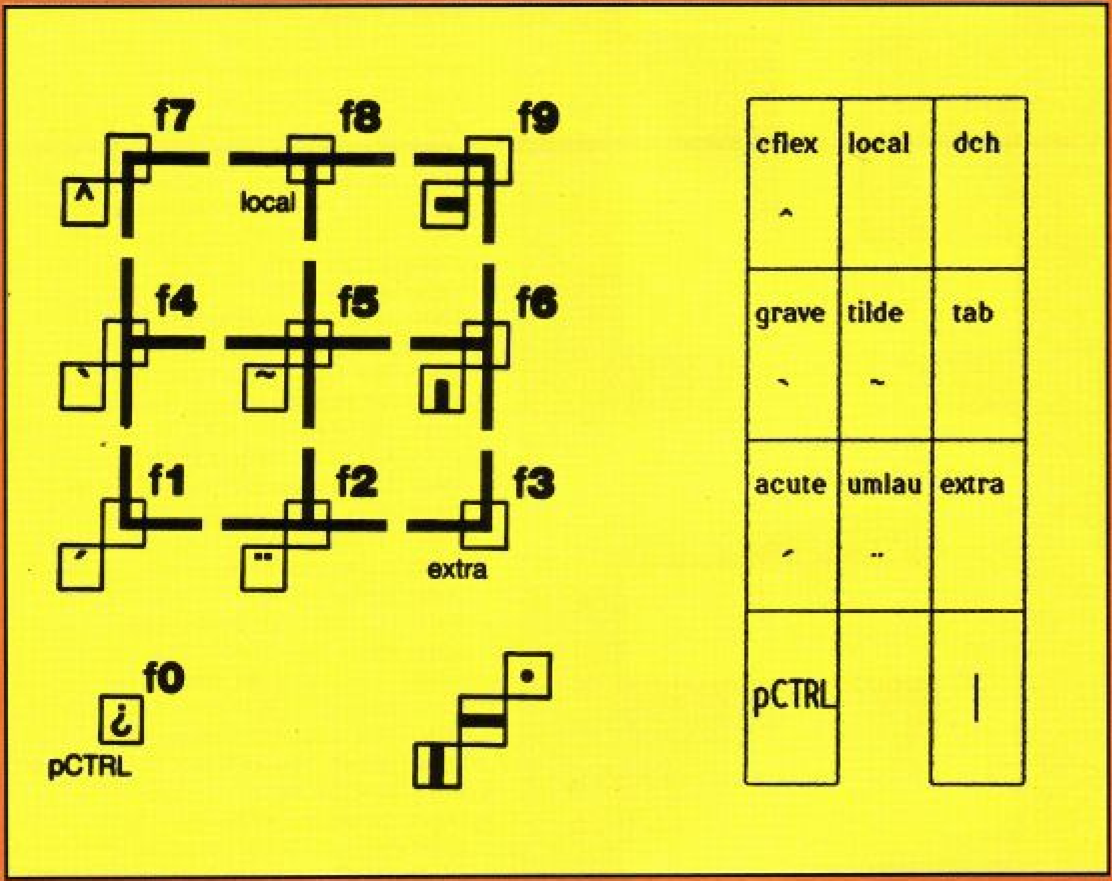


Fig 2: The user-defined keypad makes for easy accenting.

Indeed, using Protype, you can add any number of these diacritics to any character. When you consider that the program has been designed to cope with up to 40 European languages, you'll realise that there's a whole lot of variations to be had in terms of character printing. In all, you can access an extra 54 characters on screen, using defined keys for creating accents.

This may sound like gobbledygook, but when you consider that 1992 and a supposedly united Europe is looming up fast, I think it's about time we British got to grips with some foreign lingos.

Putting aside the accents for a moment, there are many other standard features that should appeal to those of a more homeloving nature.

Superscripts, subscripts, underlining, boxing, encircling of characters and mirror imaging of text all come as standards with Protype, allowing you to create even the most complicated of mathematical equations in any of the resident fonts, as well as enabling you to highlight specific areas of text.

As a versatile typesetting tool, other features include the justification of text, allowing for microjustification on all line spacings. Text can be proportionally tabulated, and line graphics can be used to create an excellent finish to any written product.

Setting column widths, up to a maximum of 20cm, Protype allows you to set out text with great variety, with appropriate spacings, for an extremely

professional finished product.

In fact, about the only thing you can't do, is actually edit the text. Rightly so, for the program is designed for use with other word processing programs such as Protext itself.

For those of you who have yet to sample Protext, the Protype program can also be used straight from BASIC, and also from other commercial wordprocessing, database or spreadsheet programs without too much reconfiguration, as long as they produce non-graphics printer output.

However, one point to note is that, although Protype only takes up around 350 bytes of the memory available for text and programs in the main 64k, you must ensure that the program you use with it, does not need the second bank of memory in the 6128. As a result, Protype cannot be used with CP/M Plus programs.

For Protext users, many of the instructions within Protype will be part and parcel of your word processing routine, but, for the uninitiated, Protype may well be hard work getting used to.

A quick read through the manual will inform you that a thorough knowledge of Protext is essential before ploughing on with your text alterations, while those of you planning to make a start directly from BASIC, will need to have a fair idea about programming and hexadecimal notation.

To be fair, there is plenty of guidance in the manual to see you through your first steps but, without prior knowledge, making the most of this program will be difficult.

Some of the toggling procedures for producing the featured effects of the utility, will need to be referred to quite often before they are mastered, which brings us back to the original point that, extremely clever program that it may be, Protype is for the specialist.

Indeed, with some foreknowledge of programming, or the Protext word processor, you can achieve outstanding results with even the lowliest of 9-pin printers. 240 DPI x 216 DPI resolution on a 9-pin printer is certainly not to be sniffed at, though some of the printouts will be slower than you may be used to with other programs.

As an example, the manual gives a demonstration of the high quality NLQ, or Near Letter Quality, characters of the resident font Klassik.626.

True enough, test the routine and the characters produced are of a very high quality, though to achieve this, the printer makes no fewer than twelve passes to create the text. Admittedly, in draft mode, the print speeds are much faster, but that is only to be expected with poorer quality output.

All in all, Protype does do exactly what it sets out to do, enhance your printing power. Specialists and students in the language fields, be it modern or ancient, will find the enhanced character sets outstanding, while mathematicians, and scientists will find the library of specialised symbols a real boon, coupled with the capability of Protype to set subscript and superscript. Even the resident fonts are of an extremely impressive quality.

In terms of text alignment, justification and the creation of published products, Protype is also an extremely valuable program to have on your side but, despite all of these excellent features in its favour, it has to be said that it may be a little too much for the beginner to handle: the starting procedures are well outlined, but extended use, without prior knowledge of programming or word processing routines, may well become tricky, leading perhaps to disillusionment with the program.

The comparatively lengthy wait for NLQ character printing may also detract somewhat from a program that is nonetheless undoubtedly going to become a firm favourite amongst Arnor followers and a must for those CPC word processor users who require that bit more than just the normal a, b and c in their text.

Retailing at an inclusive price of £30, the price is pretty much within everybody's range and the Protype enhancer works with the 6128, 6128+ and the 464 machines with 64K expansion and disk drive, coupled to an Epson compatible printer.

Fig 3: A serious linguist's paradise. A selection of the diacritics available with Protype.

Albanian	ç ë
Anglo-Saxon	þ ð æ œ ā ē ī ō ū ǣ œ̄
Czech	á č ď é ě í ň ó ř š ť ú ů ý ž
Danish	æ ø å ö
Estonian	ë ö õ ü
Finnish	å ä ö
French	œ à â ç é è ê ë î ï ô ù û ü
German	ß ä ö ü
Hungarian	á é í ó ö ő ú ü ű
Icelandic	þ ð æ œ á é í ó ö ú ý
Irish Gaelic	á é í ó ú
Italian	à è ì ò ù
Latvian	ā č ē ģ ī ķ ļ ņ š ū ž
Lithuanian	ą č ę ė į š ų ū ž
Norwegian	æ ø å
Polish	ą ć ę ł ń ó ś ź ż
Portuguese	á à â ã ç é è ê í ì ó ò ô õ ú ù
Romanian	á â ă è ì î ş ţ ù
Scots Gaelic	à é è í ó ò ú
Serbo-Croat	ć č đ š ž
Slovak	ä á č ď é í ľ ň ó ô ŕ š ť ú ý ž
Slovene	č š ž
Spanish	á é í ñ ó ú ü
Swedish	å ä ö
Turkish	á â ç ğ ı î ö ş (ş) ü û
Welsh	á â ê ë î ï ô ö û ŵ ŷ

Program: Protype
Price: £30
Supplier: Arnor Ltd, 611 Lincoln Road, Peterborough, PE1 3HA
Telephone:(0733) 68909


MYTH
THE FINAL CONFLICT
Join in as the evil god Dameron plays his final trump card in the pyramids of ancient Egypt.
Level 4
The temple door.
Nngh!
Looks like a gun job.
The corridors of power.
There must be a sequence.
Beware the spike pits!
Yaaah! That's sharp!
The Ankh-Cross of Life...
This may come in handy.
Hmm. Never felt better.
Dameron, here I come.
...a vital health restorer.



Reaching the lower catacombs...
...reveals greater terror!
The mummies attack!
Eat lead, Zombies!
The lull before the storm.
Uhuh.
Now to position
some caskets.
The Sphynx awakens...
Aaaargh!
...but proves no match for our fearless hero.
Colin Jones '91
That's it. At last the
evil is vanquished.
Just another job for a grade one hero.
Dameron defeated,
the evil dissipates
and a dark shadow is
cast from the face of
humanity. Mission
accomplished.

continued from page 51

points are the minimum number allowed.

If you wish to create a cross-section from scratch as opposed to editing the current one, press CONTROL and W. The first two points are drawn for you but can easily be repositioned. To add extra points, place the cursor over the point nearest the centre and press COPY. When happy with its position press COPY for the next point and so on. Pressing SPACE will end this process.

A warning noise will sound if you attempt to select an invalid option eg selecting a point which isn't there.

To return to the main menu press ESCAPE.

(2) Save Cross-section

The current cross-section is shown and you are prompted for a filename. Pressing RETURN on its own will return you to the main menu. To save it, enter a valid filename remembering that only the first eight characters will be used. Tape users should press REC+PLAY before pressing RETURN as the program starts saving straight away.

(3) Load Cross-section

Identical to option 2 but is used to load cross-sections from tape/disk.

(4) Create Rotation

Transforms the current 2d cross-section into a 3d wireframe solid. Simply enter the number of faces you wish the solid to have (8 to 20) work best, and press RETURN. Pressing RETURN on its own will return to the menu.

(5) Save Rotation

Saves the current rotation as a 17k binary file. This file can be loaded into your own programs by typing:

MODE 1:LOAD"filename",&c000

This option can also be used to view the current rotation without having to recalculate it. Press RETURN on its own to return to menu.

(6) Exit Program

Returns the user to BASIC. Type RUN to restart program although cross-section will have been reset.

Command Summary

Cursor keys: Move cross-hairs.
'.': Move to nearest point.
SPACE: Select/deselect point underneath cursor.
COPY: Create+select new point.
CTRL+DEL: Delete selected point.
CTRL+W: Wipe cross-section.
ESCAPE: Return to menu

```
2390 DRAWR xc,yc
2400 xc=x(m+1,0)-x(m,0)
2410 yc=b(m+1)/1.7-0.5*z(m+1,0)-b(m)/1.7+0.5*z(m,0)
2420 DRAWR xc,yc
2430 NEXT
2440 GOSUB 3110
2450 CALL store
2460 GOSUB 3040
2470 PEN 3:LOCATE 8,24
2480 PRINT"Press SPACE to continue..."
2490 IF INKEY(47)=-1 THEN 2490
2500 GOTO 30
2510 ' --- Save Rotation ---
2520 CLS
2530 CALL view
2540 GOSUB 3040
2550 GOSUB 2970
2560 IF f$="" THEN 30
2570 f$="!"+f$
2580 SAVE f$,b,&6000,&4000
2590 GOTO 30
2600 END
2610 ' --- Subroutines ---
2620 ' Error detected
2630 FOR n=1 TO 1000:NEXT
2640 RESUME 30
2650 ' Update right line
2660 IF p<0 THEN MOVE a,b ELSE MOVE a(p),b(p)
2670 DRAW a,b,1
2680 IF q=point THEN DRAW a,b ELSE DRAW a(q),b(q)
2690 RETURN
2700 ' Update left line
2710 IF p<0 THEN MOVE 640-a(p+1),b(p+1) ELSE MOVE 640-a(p),b(p)
2720 DRAW 640-a(p+1),b(p+1),1
2730 IF q=point THEN DRAW 640-a(p+1),b(p+1) ELSE DRAW 640-a(q),b(q)
2740 PLOT 640-a(p+1),b(p+1),1
2750 RETURN
2760 ' Set transparency
2770 LOCATE 1,1:PRINT CHR$(23)+CHR$(a)
2780 RETURN
2790 ' Display cursor
2800 MOVE x1,52:DRAWR 0,296,2
2810 MOVE 322,y1:DRAWR 236,0
2820 RETURN
2830 ' Draw cross-section
2840 GOSUB 2910
2850 MOVE a(0),b(0)
2860 FOR n=1 TO point-1:DRAW a(n),b(n),1:NEXT
2870 MOVE a(0)-4,b(0)
2880 FOR n=1 TO point-1:DRAW 640-a(n),b(n),1:NEXT
2890 FOR n=0 TO point-1:PLOT a(n),b(n),3:NEXT
2900 RETURN
2910 ' Draw box & centre line
2920 a=0:GOSUB 2760
2930 MOVE 80,50:DRAWR 480,0,3
2940 DRAWR 0,300:DRAWR -480,0:DRAWR 0,-300
2950 FOR n=50 TO 350 STEP 6:PLOT 320,n:NEXT
2960 RETURN
2970 ' Get filename
2980 CALL &BB03
2990 PEN 1:LOCATE 7,23
3000 PRINT"Enter Filename (max=8 chars)"
3010 INPUT#1,f$
3020 f$=MID$(f$,1,8)
3030 RETURN
3040 ' Header on
3050 WINDOW 1,40,1,25
3060 PAPER 1:PEN 3
3070 LOCATE 18,1:PRINT"Lathe"
3080 PAPER 0
3090 WINDOW 1,40,2,25
3100 RETURN
3110 ' Header off
3120 WINDOW 1,40,1,25
3130 LOCATE 18,1:PRINT"     "
3140 RETURN
3150 ' End program
3160 MODE 2
3170 PEN 1:PRINT"Bye!!"
3180 END
```

This is it, the one the Doc never saw, and he'll be counting his blessings by now.

But seriously...

Remember that old model railway poser? You do? Well here's a little something from Peter Dalton of Scunthorpe that should set your brains reeling. He writes:

"Dear Doc, could you help me with this pain in my neck (I married her 18 years ago)...but seriously, I hope you are fit and working well.

In the April '91 issue there was a query from Peter Wilson in Cornwall about I/O ports to control a railway signalling system. I have enclosed a couple of circuit diagrams that show how a Peripheral Interface Adaptor (PIA) can be connected to the Amstrad. The first one shows a single PIA giving 24 ports that can be configured for input or output in various combinations. Also enclosed is a copy of the 8255's programming notes. I know this basic setup works 'cos I've built it to control a certain peripheral that I made.

Now, the way I read the article, Peter needs 20 inputs and 30 outputs with more in the future so I have devised a small modification to the original circuit, see diagram 2. The mod consists of building three individual boards and connecting the address leads in such a way that only one port, from any board, is enabled at any one time. The simplest method that I could think of, and still keep close to the original diagram ('cos we know this works), is to take address leads 3 and 4 to a transistor each and feed the output of the transistors to control boards 2 and 3. The various addresses to access any port are shown below:-

&FBF8 board 1 port A data in/out
&FBF9 board 1 port B data in/out
&FBFA board 1 port C data in/out
&FBFB board 1 control set up

&FBE8 board 2 port D data in/out
&FBE9 board 2 port E data in/out
&FBEA board 2 port F data in/out
&FBEB board 2 control set up

&FBFO board 3 port G data in/out
&FBF1 board 3 port H data in/out
&FBF2 board 3 port I data in/out
&FBF3 board 3 control set up

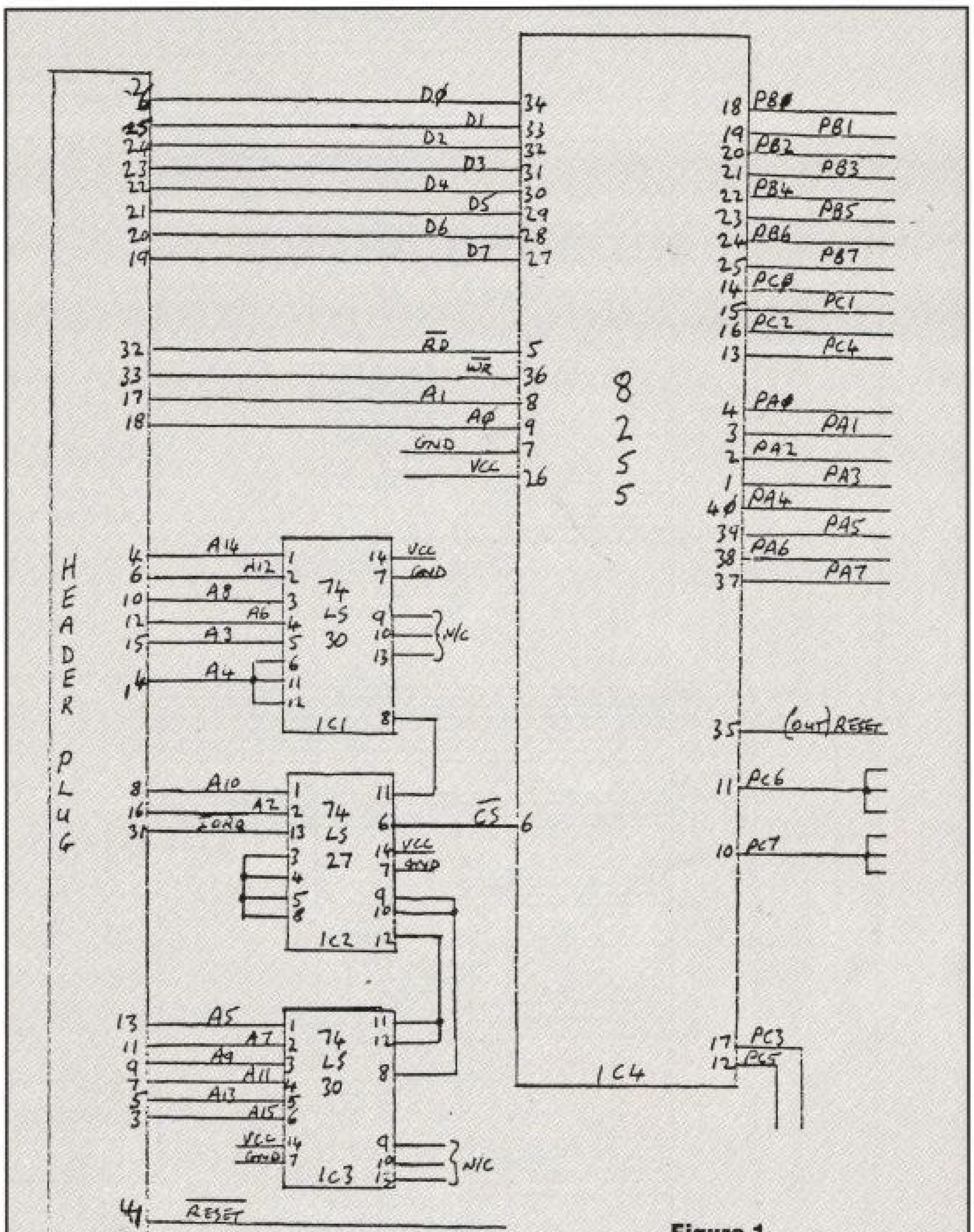
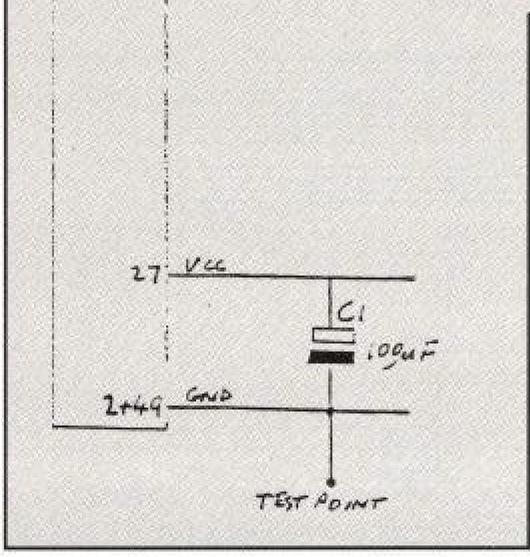



Figure 1

These addresses are all within the 'rules' as laid down by the Firmware Guide.

This will give 9 ports of 8 bits each, ie 72 separate ports, that can be input or output in any combination. Also a fourth board could be added later if required giving a further 24 in/outs (&FBEO-&FBE3).

Using the ports is fairly straight-forward with the OUT and INP commands from basic, or the OUT and IN from machine code. To set ports A to C for input use:-

OUT &FBFB,&9B this 'writes' &9B to the control port of board 1.

Port D could be input with ports E and F output:-

OUT &FBEB,&90

Then ports G to I are all outputs:-

OUT &FBF3,&80 these 3 OUTS would give 32 inputs leads and 40 outputs.

So to 'read' a single input from port B we would use:-

B=INP &FBF9 and test the 'bit' of variable B that we are interested in. And to output bit 4 say, of port G we would use:-

G=G+8

OUT &FBFO,G

continued on page 61 ▶

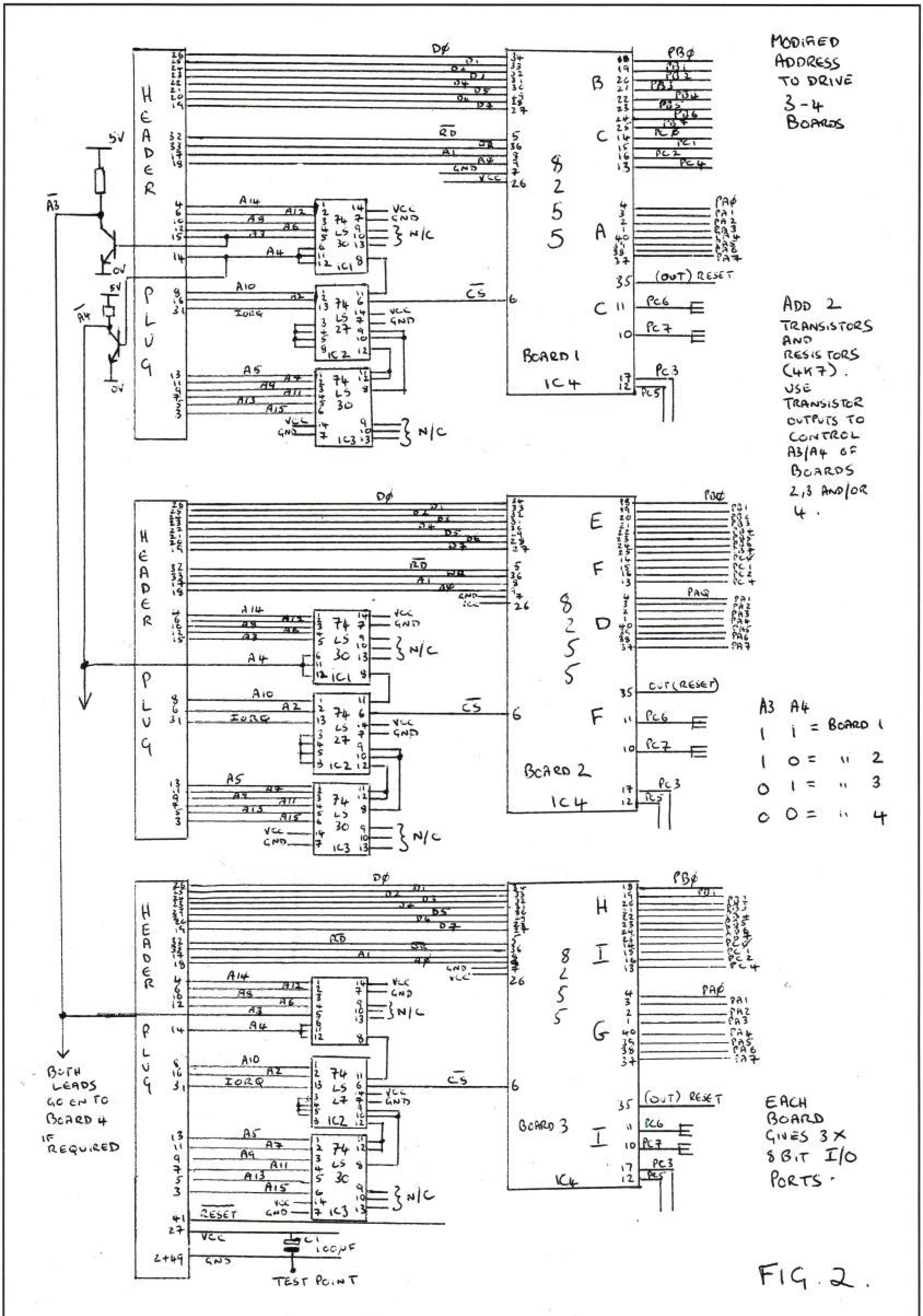

MODIFIED ADDRESS TO DRIVE 3-4 BOARDS
ADD 2 TRANSISTORS AND RESISTORS (4K7). USE TRANSISTOR OUTPUTS TO CONTROL A3/A4 OF BOARDS 2,3 AND/OR 4.
A3 A4
1 1 = BOARD 1
1 0 = " 2
0 1 = " 3
0 0 = " 4
BOTH LEADS GO ON TO BOARD 4 IF REQUIRED
EACH BOARD GIVES 3 X 8 BIT I/O PORTS.
HEADER
PLUG
8255
BOARD 1
BOARD 2
BOARD 3
IC4
74 LS 30
74 LS 27
N/C
(OUT) RESET
TEST POINT
FIG. 2.

Figure 2

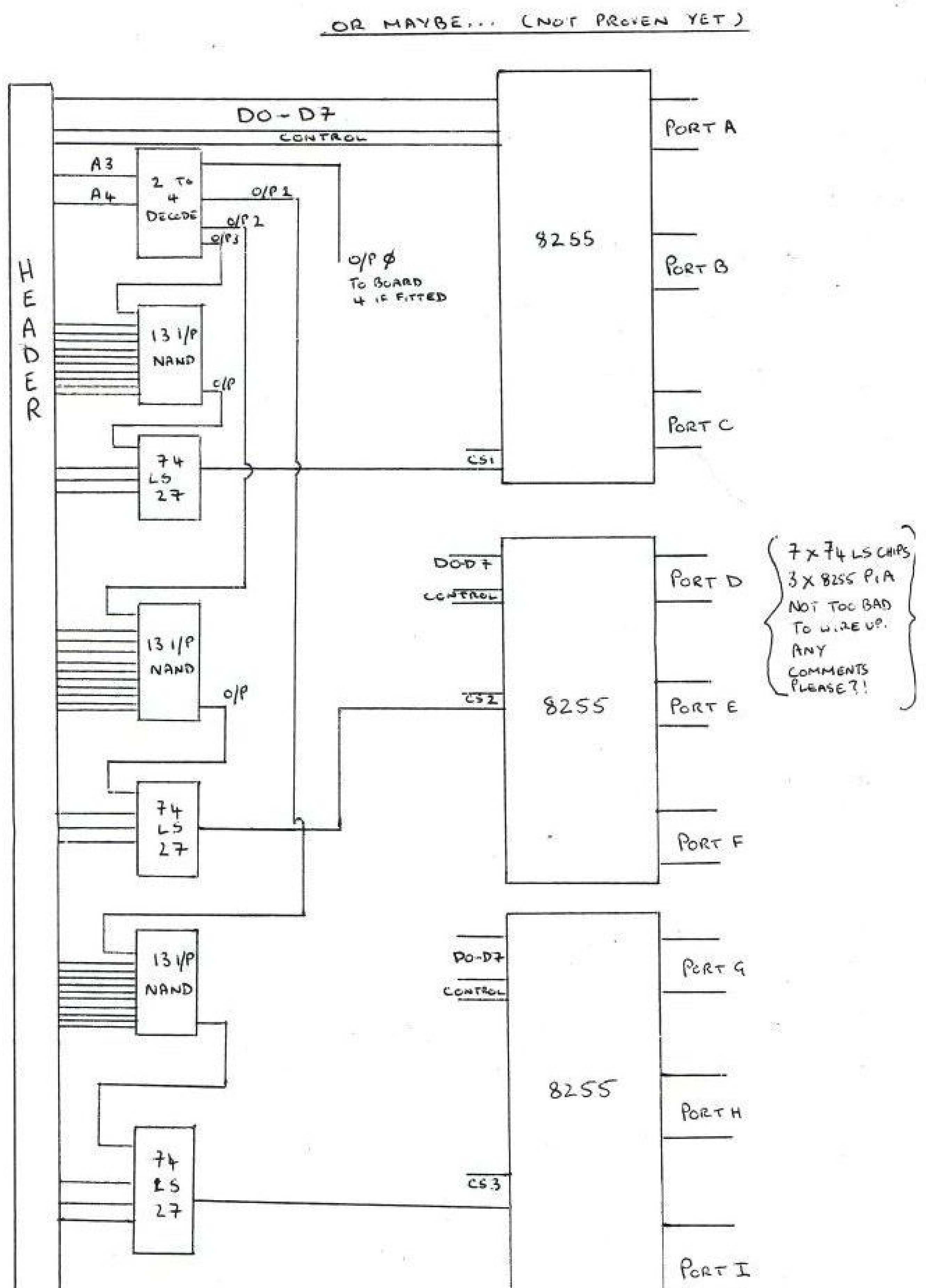


Figure 3

continued from page 59

It could be possible to redesign the final diagram completely, using for instance, a 2 to 4 (or maybe even 3 to 8) decoder to switch between boards. Or maybe to simplify the address decode by using IC3 (from board one) to supply all boards with this part of the address (this bit is common to all boards), see figure 3. Unfortunately these other designs are unproven as yet but they should work. As I said earlier, keeping as close as possible to the original is probably safest 'cos I know this works.

One final point about the connexions to the outside world. It should be possible to use transistors on the outputs to interface with the train layout but personally I would go for safety and use opto-isolators, especially as the cables are to be run outside. This would give some measure of protection from lightening, short circuits, etc. Please feel free to use any or all, or none, of this as you require. I would be pleased to hear if anyone else has any suggestions or modifications to add."

If you like what you see, or if you want some help on the Intel Interface notes, try getting in touch with Peter at 95, Baysdale Road, Ashby, Scunthorpe, Lincs ON16 2QF. In the meantime, get your irons out and start heating up the old flux.

On the Operating Table

On with the applications of your brand new toy

Last month, you should hopefully have got your input/output port up and running. So, now, what do you do with it? Once inserted into the expansion socket, your computer will have 16 input lines and 16 output lines at its disposal. These are arranged into four ports:

Port	Address (Hex)	Status
A	&f8e0	Input
B	&f8e1	Input
C	&f8e2	Output
D	&f8e3	Output

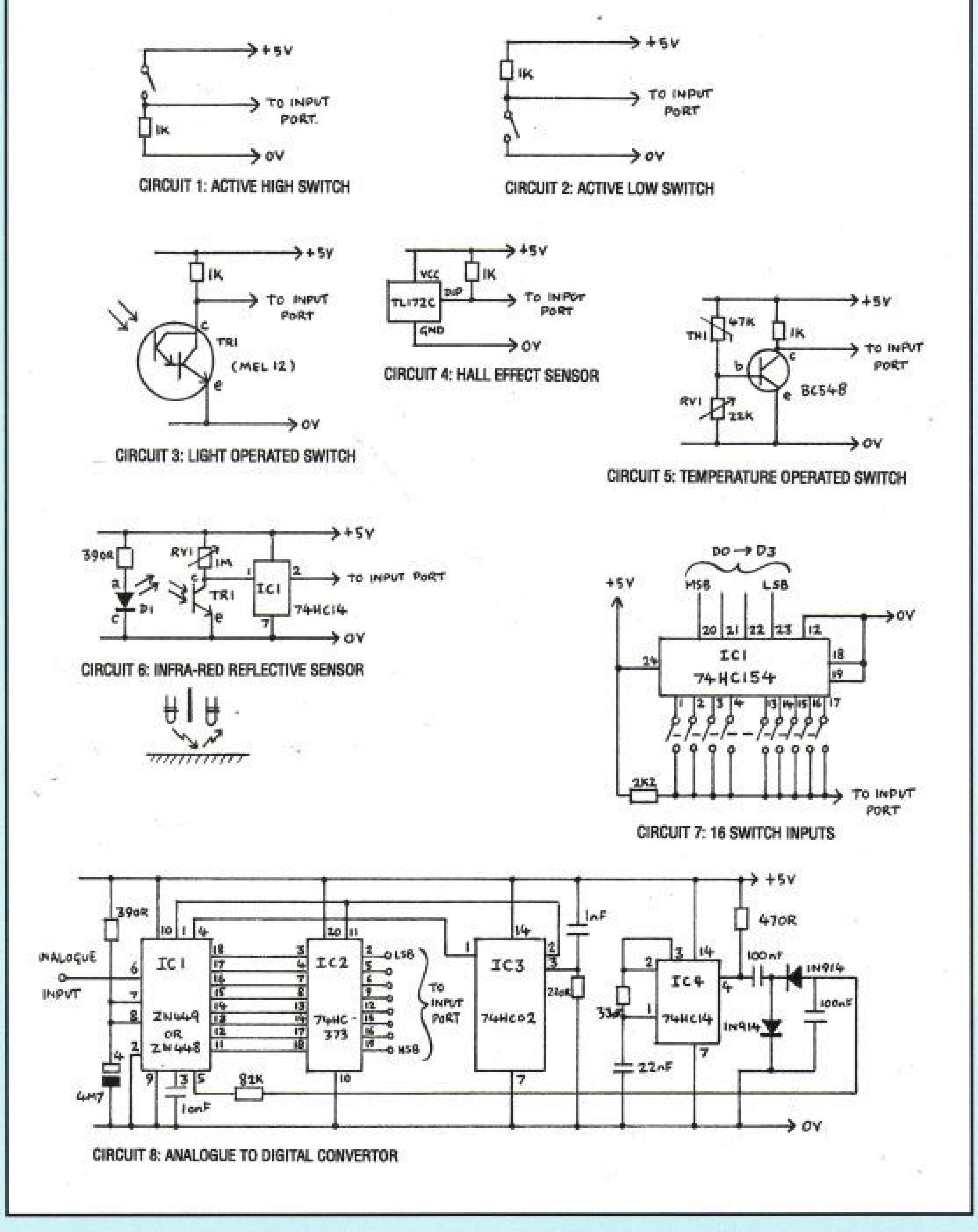
Each port therefore handles eight lines and is mapped onto a byte in the computer's memory. The precise address of this byte can be obtained from the above table. Because a byte consists of eight bits, it will come as no surprise to discover that each bit in each address corresponds to one of the data lines in its associated port. For example, bit 3 of the byte located at address &f8e2 corresponds to output 3 of port C. Similarly, the state of input 8 in port A can be discerned by testing the state of bit 8 of the byte at &f8e0.

A bit can only be either 1 or 0 so its associated data line must either be high/on (1) or low/off (0). Such signals are said to be digital. Rather than deal with each bit separately, all eight bits in a port are often represented together by a single decimal number in the range 0-255.

Data line/Bit: 7 6 5 4 3 2 1
Decimal value: 128 64 32 16 8 4 2 1

As the table shows, each data line is assigned a decimal value. For each input port the value in its address is the total of the decimal values for all the data lines which are high. By summing the values of all the data lines you wish to be high in one of the output ports you obtain the value to be placed in its address. This relationship is a binary one (each decimal value in the table is 2 to the power of its bit number) and accounts for 255 being the maximum decimal value available – when all data lines are high. Obviously the value will be zero when all data lines are low. Determining the decimal value associated with the various high/low patterns in between these extremes can be speeded up with the following BASIC commands:

Application Circuits



(i) PRINT &X11001110
(ii) PRINT BIN& (102)

Statement (i) is used to convert from binary to decimal where 11001110 is replaced by the binary number in question. Statement number to be converted.

To acquire the decimal number representing an input port use:

PRINT INP (address)

Remember to include the & prefix for the address as this signifies a hexadecimal number. To send a number to an output port use:

OUT (address), decimal value

Again, the & symbol is required. A binary number may be substituted in place of the decimal value as long as it is preceded by &X.

For all you assembler fanatics, here

are the necessary mnemonics:

Input	Ld BC, port address	;	i.e. &f8e0 or &f8e1
	In A, (C)	;	accumulator now holds the
		;	inputted byte
Output:	Ld BC, port address	;	i.e. &f8e2 or &f8e3
	Ld A, output value	;	0→255
	Out (C), A	;	value has now been sent

Applications

By now you've probably output and input lots of values but have not seen much happen as a result. The next sections have numerous examples of how to use your newly created electronic wonder, in the form of small basic circuits intended to be the building blocks for more complex designs.

Only the circuit diagrams are given but they are generally so simple that you should have little trouble in constructing them. Unless you have a definite project in mind it would be foolish to solder these small circuits onto stripboard, thus committing the components for good. A far easier way to experiment is to use a 'breadboard' or 'plugblock'. These are basically arrays of electrical contacts, arranged in a sort of grid, and able to accept standard components without the need for soldering. Electronic devices can be inserted and removed until the desired circuit has been constructed. Such a board (code FD29G), consisting of 840 contacts divided into strips of five with various buses, is sold by Maplin for around £7.

In whatever way the circuits are developed, they will need to be connected to the port itself. The way that I find easiest is to insert an 8-way locking plug assembly (identical to the connectors on the interface) into the application circuit, and use a long piece of ribbon cable with suitable female sockets on either end to form the link. This method means that only the relatively cheap plug assemblies need be committed to each project, whilst the more expensive connecting cable can be used over and over again. To make this connecting cable it is necessary to solder special PCB terminals (code YW25C) onto both ends of the individual wires in the ribbon cable. These terminals are then permanently inserted into the two socket housings (code YW23A). A similar principle could be employed for the connections to the power pins, or the 5v and 0v lines could be incorporated into a wider ribbon cable.

The final point that needs to be made is that of power supplies. As has already been mentioned, the interface provides access to the Amstrad's internal, regulated 5v power supply. These are provided as reference voltages, NOT as a means of powering motors, lamps or other external devices (including application circuits). Any attempt to draw more than a few milliamps from these terminals could result in damage to the computer! A much more sensible option is to use a simple mains adaptor capable of providing a regulated 5v current and any other voltages you require. When doing this, do not forget to connect the 0v or GND (ground) terminal of your external power supply(s) to the 0v terminal on the interface – otherwise you might have trouble communicating with the external circuitry.

Below is a quick summary of each port's position on the circuit board, given by its address.

TOP OF THE CIRCUIT BOARD	
&f8e2	&f8e3
&f8e0	&F8e1
EDGE CONNECTOR	

Input Circuits

By this stage you will probably have experimented with one or both of the following BASIC statements:

```
PRINT INP (&f8e0)

PRINT INP (&f8e1)
```

If everything is working, the value returned in each case should be 255 – indicating that all eight input lines are high. This may be a little surprising, especially if you have nothing attached to the port connectors. The reason is that when TTL logic inputs are left unconnected they 'float' high, giving the value 255 in this case. As soon as they are connected to either 5v or 0v the value will change. To try this, enter the short program below and type RUN [ENTER].

```
10 ? INP(&f8e0), INP (&f8e1):
GOTO10
```

Now take a short piece of wire, touch one end to the 0v terminal, and the other end to each input line of ports A & B in turn. The numbers on the screen will change, indicating that all is working. If all the input lines of a port were kept at 0v the subsequent value would obviously be zero. Similarly, if all eight lines were kept at +5v then the value would be 255, however, this time the inputs would not be floating.

Circuits 1 & 2 use this principle to allow an input line to be triggered by a simple SPST (Single Pole Single Throw i.e. on/off switch). The advantage of using the pull up resistor is that the input line is never allowed to float – it is always kept at either 0v or +5v. This is particularly important when the switch is off. These first two circuits do not need an external power supply (although one could be used if desired) as negligible current is drawn from the 5v pin.

The next four circuits extend the idea of a digital input to cover other sensors besides simple switches. Circuit 3 uses a photo-darlington translator (Maplin code: HQ61R) to detect light, be it flourescent, incandescent or just plain old sunshine. The Hall-effect switch (Maplin code: WQ75S) in circuit 4 detects magnetic fields, albeit over a limited range, and is easily triggered by a small bar-magnet. A thermistor (Maplin code: FX42V) denoted as TH1 in circuit 5, senses changes in heat. The temperature at which this circuit's output changes is adjustable by RV1 – a potentiometer. Circuit 6 uses an infra-red transmitter and receiver to determine how much IR light is reflected off objects put near them. They should be arranged as shown in the small diagram, with the light emitting diode (YH70M) next to the IR phototransistor (YY66W), so that invisible light can bounce off the surface and be detected. By doing this, circuit 6 can distinguish between black and white objects. Applications include line following or marking multiple-choice answer papers. A little experimentation may be required to achieve the optimum distances (a few mm), and the necessary setting of RV1 which determines the switching threshold. Circuits 3 to 6 all contain components which need to be connected the right way around. Any catalogue should contain the necessary information, together with further details regarding the sensors used in the circuits.

A fairly common requirement of users is the ability to monitor many inputs simultaneously. When there are only three or four shc inputs it is prac-

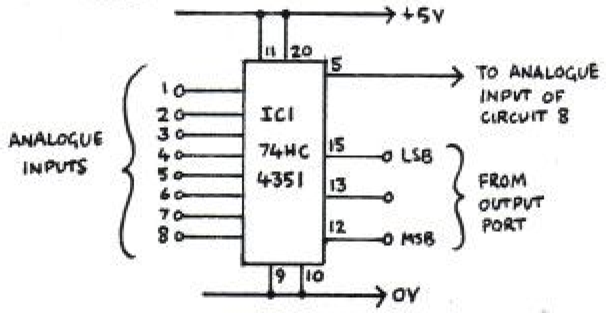
Application Circuits



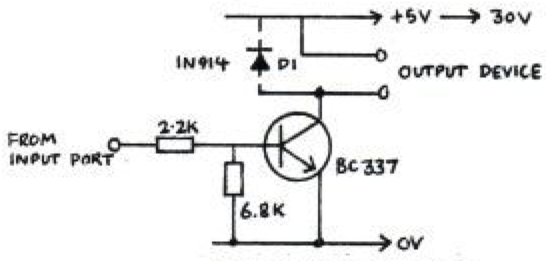
CIRCUIT 10: ACTIVE HIGH L.E.D.



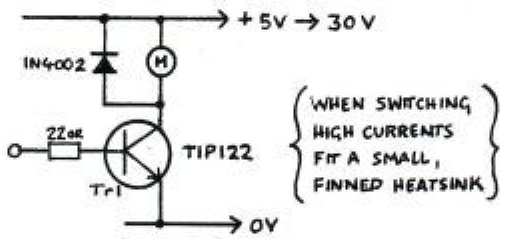
CIRCUIT 11: ACTIVE LOW L.E.D.



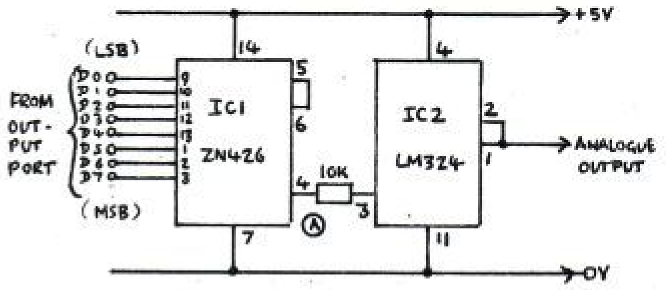
CIRCUIT 9: ANALOGUE SWITCH (FOR MUTIPLE INPUTS)



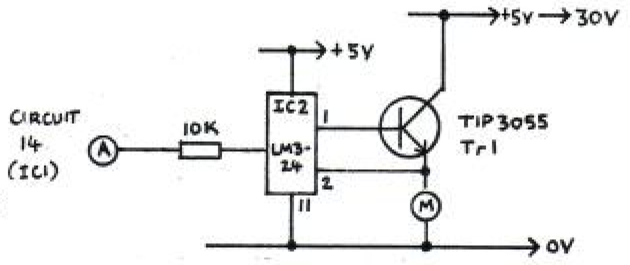
CIRCUIT 12: OUTPUT DRIVER



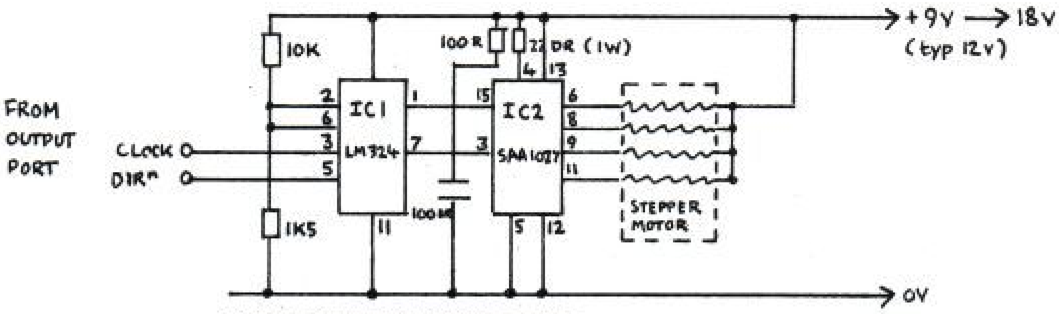
CIRCUIT 13: MOTOR DRIVER



CIRCUIT 14: DIGITAL TO ANALOGUE CONVERTOR



CIRCUIT 15: MOTOR DRIVER FOR CIRCUIT 14



CIRCUIT 16: STEPPER MOTOR DRIVER

tical to assign each one a separate input line; but should you wish to monitor dozens of switches etc, things become more complicated. Clearly there are not enough input lines to go round so an alternative solution must be devised – circuit 7. What this does is to allow access to sixteen switches, sacrificing only one input line and four output lines. When using this circuit, the output lines involved are set to a number between 0 and 15 (in binary), and the state of the corresponding switch can be found by testing the input line (note that all switches are active low). It is then a simple matter of writing a short program to scan all sixteen switches repeatedly. If this is done in machine code then obtaining the state of all the switches is virtually instantaneous. An identical system is employed in scanning computer keyboards, where having a separate input for each key would be totally impractical. Because the keyboard scanning is carried out by low-level firmware routines the process remains transparent. While sixteen inputs may suffice for simple data entry pads, QWERTY/musical keyboards and complex burglar alarm systems may require sixty or seventy inputs. Fortunately circuit 7 can be expanded, eight output lines and one input line enables 256 inputs to be scanned. To implement this, circuit 7 must have its sixteen switches and the 2k2 resistor removed to become the master controller circuit. Up to sixteen further slave circuits, identical to the old circuit 7, can then be brought in, all sharing the same input line and the same extra four data lines (d4→d7). The only alteration needed is to connect pin 18 of each slave circuit to a different one of the sixteen output pins from the master circuit. A value between 0 and 255 can now be sent on the eight output lines and the state of the associated switch is detected by the one input line – as before. Having constructed the master circuit, attach only the required number of slaves remembering that each slave provides an additional sixteen inputs.

The input circuits given so far only provide for a digital input. For example, although temperature varies over a large range, circuit 5 can only tell you if it is above or below a certain threshold – not what the temperature actually is. To measure such analogue quantities requires additional circuitry, such as that outlined in circuit 8. At first glance it probably appears rather complicated but, with careful planning, there is no reason why it should not be successfully constructed. The design centres around IC1 which is the analogue to

digital convertor itself. This IC can either be a ZN449 or ZN448, both are pin-for-pin compatible and are virtually identical (the 448 is slightly more accurate). The ZN449 is half the price of the ZN448 but is only available through Farnell, while the more expensive ZN448 can be easily ordered from Maplin. Whichever chip you choose, their operation is identical; a variable analogue input is translated into an 8-bit digital output. Therefore the digital representation of the input has a resolution of 256. For the circuit shown, the input can vary between 0v and 2.55v so that each binary level corresponds to 10mv. Additional circuitry has been included to relieve the computer of checking to see when the ADC is busy, and signalling to it to start the conversion process. Instead, the ADC operates continuously, placing each successive 8-bit output in a latch (IC2) where the computer can access it. Further components (notably IC4) are needed to generate a small negative voltage to drive pin 5 on the ADC.

Having constructed circuit 8, attach the analogue input to 0v and continuously monitor the circuit's output. The numbers generated should be mainly zeros perhaps with the occasional one. Now take the analogue input and connect it to pin 8 on IC1 (this provides a 2.55v reference voltage). The numbers generated should be around 255. Obviously voltages in between these two extremes will have corresponding numbers. A simple way of providing an analogue input is to use the centre terminal on a 10k LIN potentiometer with the terminals on either side connected to 0v and +2.55v respectively. As you turn the pot's shaft, the numbers produced should vary smoothly from 0→255. This setup could be used to produce a simple game control or analogue joystick where the controller's position is directly related to the position of a cursor on the screen. Other applications include recording the variations in temperature with time, and the digitising of audio signals.

Clearly, in order to monitor analogue signals you have to be willing to sacrifice a large number of input lines. This isn't too much of a problem when dealing with one analogue signal but should your application require multiple analogue inputs you could very well find yourself running out of input lines. Circuit 9 aims to alleviate the problem by employing a principle similar to that used in circuit 7. The circuit takes eight analogue signals and routes only one through to the input of circuit 8, depending on the value of the three digital inputs.

Output Circuits

Upon powering up the computer, it is a good idea to send a value of 0 to ports C & D thus ensuring that all output lines are low. One of the simplest ways to see the effect of changing an output line comes in the form of circuit 10. When the output line, to which it is attached, is turned on, the LED lights (no power supply required). In circuit 11, the LED line is high. An ordinary voltmeter could also be used to do the jobs of circuits 10 & 11.

The first thing to realise about the interface's outputs is that LEDs are about the only thing they can drive directly. Circuit 12 provides an easy way to control lamps, relays, buzzers, bells etc. The most useful of these devices is perhaps the humble relay. By controlling the relay's coil, you can in effect control much more powerful devices (including mains appliances) whilst keeping the circuits isolated. If your aim is to control mains powered devices, then be sure to select one of the special mains relays available and observe the usual safety precautions.

Circuit 12 can accommodate any output device that draws less than 500ma which unfortunately excludes many dc motors, especially when under load. Circuit 13 is therefore a special motor driver circuit that can be used to control motors that draw up to 3A. Because this circuit may have to handle such large currents, it would be wise to fit a small, finned heatsink to the translator Tr1.

Just as analogue inputs are often necessary, analogue outputs may be needed. Circuit 14 is a simple digital to analogue convertor circuit, the counterpart of circuit 8. The DAC circuit is simpler, and also cheaper, to produce – requiring far fewer components. The analogue output from pin 4, which varies between 0v and 2.55v in accordance with the 8-bit binary input, is far too weak to drive even small circuits directly. IC2 is thus used as a buffer amplifier to boost the signal, allowing it to be further amplified according to the specific needs of your application. However, a voltmeter can be used to check that the analogue conversion process is working properly. With suitable external circuitry, circuit 14 could be used to replay sounds that were 'sampled' with circuit 8.

An alternative use for the DAC circuit is to control the speed of a dc motor. Rather than use cumbersome pulsing systems, circuit 15 connects directly to pin 4 of IC1 in circuit 14 and allows accurate speed control over any motor up to 3A. Due to the use of feedback in circuit 15, the effect of varying loads on the motor's speed has been minimised. As with circuit 13, Tr1 should be mounted on a heatsink but if your motor's power requirements are less demanding then a suitably lower power transistor could be substituted.

DC motors are inexpensive, easily controlled and readily available but they lack the accuracy and precision that many applications require. For example, if two identical dc motors were used to power two opposite wheels of a simple floor robot, it would very probably veer to one side due to subtle differences in each motor's speed. Even if both motors were well matched, the delay in starting and stopping due to inertia would prevent accurate tracking of the vehicle's progress. An alternative solution to these problems is the stepper motor. Such devices have many coils which can rotate the output shaft through a precise angle e.g. 7.5 degrees. This makes them ideal for roving robots and similar applications, where precise control is called for.

Because of the way in which stepper motors operate, the circuitry required to control them is generally more complicated. Several dedicated ICs are now available to ease the task, one of which is used in circuit 16. The circuit has only two inputs, one that controls the direction while the other rotates the motor. When a pulse is output on the clock line the motor will rotate through one step angle. While the direction line is kept low this rotation will be clockwise, and when high, anticlockwise. Maplin sell both the driver IC (QY76H) and a suitable stepper motor (FT73Q).

Although the circuits have been divided into two separate groups for input and output, most applications will demand using both. The circuits provided are general purpose ones intended to get you going and to illustrate the wide range of uses that an input/output port has. None of the circuits necessarily constitute the definitive solution, nor are they the most sophisticated. There is no shortage of literature on the subject and no matter how advanced, obscure, or specialised your application, somebody somewhere will have written a book about it! Good luck, and the judge's decision is final?*!

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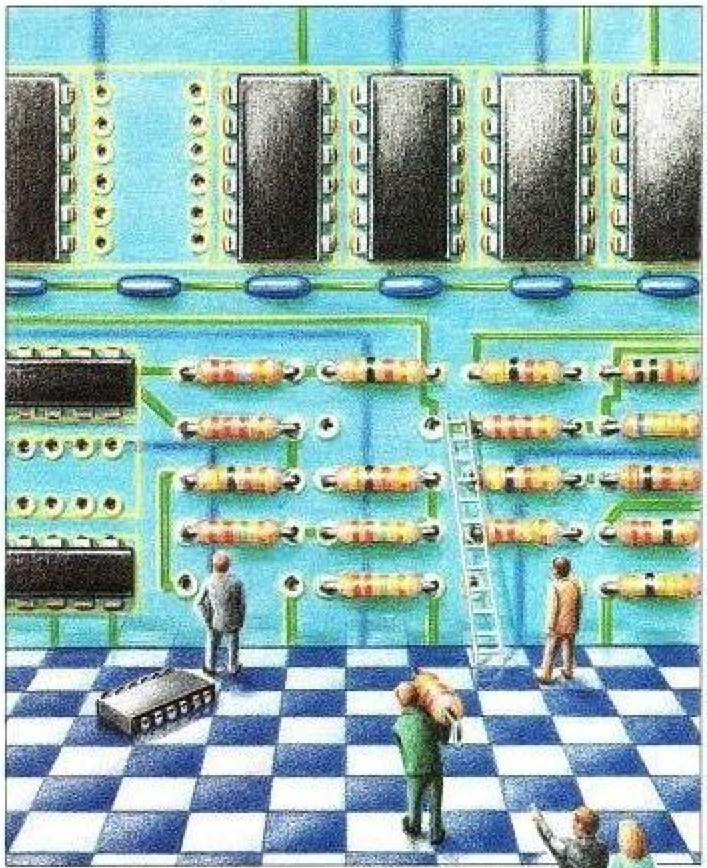
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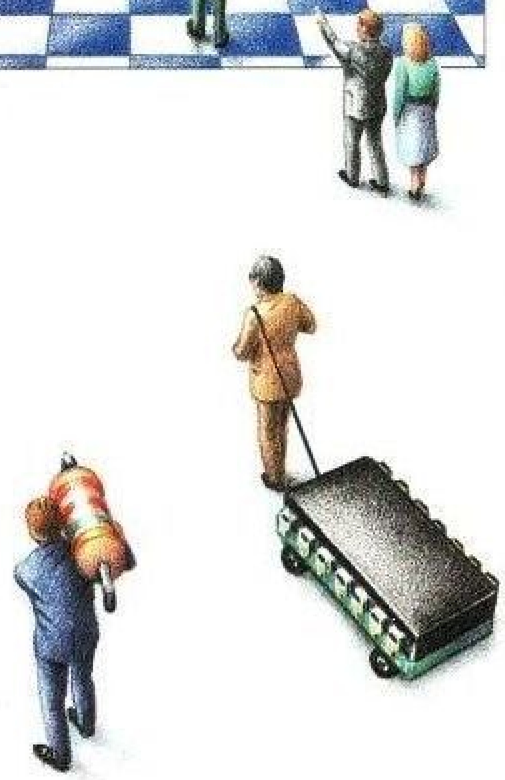
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